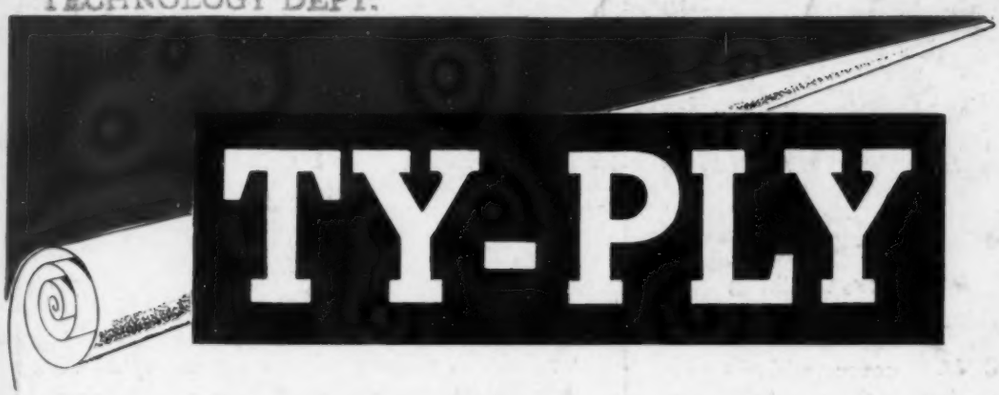
The RUBBER AGE

July, 1945

TECHNOLOGY DEPT.

PUBLIC LIBRARY
JUL 9 1945
DETROIT



TY-PLY

For Bonding Rubber to Metal

- TY-PLY is doing a fine job on military products where good bonding of Rubber-To-Metal is required.
- Civilian rubber goods will soon be in big demand and TY-PLY will be just as useful here as in war goods for good bonding to metal.
- There is a TY-PLY for each of the several types of Rubber the industry will require.

R. T. VANDERBILT CO., INC.

230 Park Avenue, New York City

Newsletter No. 7
JULY, 1945

Published by Rubber Chemicals Division of DU PONT

Follow the *Color* Trend!

AMONG the expected wants of post-war buyers for your products will be *color*. Anticipating this trend, Du Pont offers a group of excellent organic rubber colors—the best we've ever produced!

These Du Pont Colors—designated as SELECT—were carefully chosen for their—

- ★ **Versatility**
- ★ **High Tinctorial Strength**
- ★ **Good Dispersibility**
- ★ **Excellent Light-Fastness**
- ★ **Stability to Various Vulcanizing Conditions**
- ★ **Freedom from Bleeding, Migration, Crocking**
- ★ **Effectiveness in Rubber, Neoprene, GR-S-50, etc.**

DU PONT *SELECT* RUBBER COLORS cover a wide range of hues—produce almost any hue in the visible spectrum when blended in proper proportions.

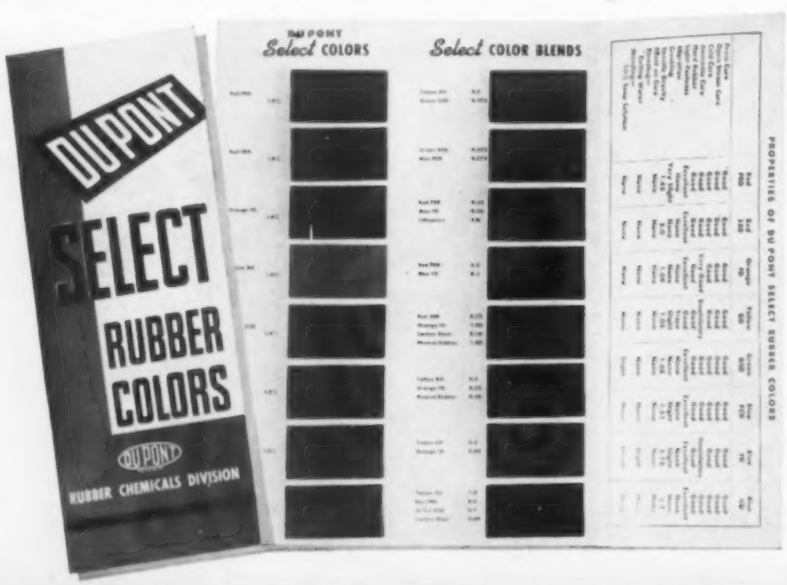
IN DRY COMPOUNDING, either dry powder or latex dispersed colors may be used. The former are soft in texture and disperse very readily. The latter are similar to Du Pont Rubber Dispersed Colors offered before the war, but are dispersed in GR-S latex.

IN LATEX COMPOUNDING, a complete line of dry powder colors, supplemented with two water dispersed pastes, is available. Dry powder *Select* Colors are easily dispersible in aqueous solutions to give fine particled suspensions, are compatible with the latices, and are unaffected by alkalies and other stabilizing agents.

Pleasing, permanent effects can be obtained with *Select* Colors in neoprene latex.

ABOUT COLOR MATCHING

When requesting an exact color match, it is necessary for you either to supply us with your exact formula along with brands and types of ingredients used in the base in which the color is to be used or even better a pound or two of your base stock. Be sure also to supply us with method, temperature, and time of cure.



WRITE FOR THIS COLOR GUIDE!—

Shows 16 samples of Du Pont SELECT Colors, blends, and their properties. Also gives the basic formula used in preparing these samples. Just address E. I. du Pont de Nemours & Co. (Inc.), Rubber Chemicals Division, Wilmington 98, Del. (For further data on Du Pont SELECT Colors, ask for Report BL-156.)

★ ★ ★

FINISH THE FIGHT—BUY WAR BONDS

DU PONT

RUBBER CHEMICALS DIVISION

BETTER THINGS FOR BETTER LIVING . . . *Through Chemistry*

THE RUBBER AGE, published monthly by The Palmerton Publishing Co., Inc., Printing Office, East Stroudsburg, Pa. Editorial and Advertising Offices at 250 West 57th Street, New York 19, N. Y. Entered as second class matter October 20, 1933, at the Post Office at East Stroudsburg, Pa., under the Act of March 3, 1879. Subscription in United States, $3.00 a year; Canada, $3.50; Foreign, $4.00. July, 1945, Vol. 57, No. 4.

TECHNOLOGY DEPT!

Photo courtesy Douglas Aircraft Co., Inc., Tulsa Plant

HYCAR PLEASES IMPORTANT CUSTOMER BY SAVING $18,950 YEARLY

CRITICALLY needed manpower—lots of it—and no trifling amount of money was saved when an aircraft manufacturer started using Hycar synthetic rubber sheet on stretch presses for aluminum. By eliminating the need for degreasing the formed aluminum, 24 time-consuming operations were eliminated; the number cut from 42 to 18!

Hycar's history is one of licking tough problems by outperforming other synthetic rubbers; saving time and money by serving dependably; satisfying customers by *proving* its ability to do the job assigned to it. That's why so many men in the rubber industry have made Hycar the standard special purpose rubber in their plants. Their customers and prospects—engineers and design men throughout *all* industry—have approved Hycar, and are demonstrating that approval by asking for more parts made from Hycar.

Our Technical Service Staff would like to help you in any phase of your synthetic rubber work—compounding or processing—new ideas or old applications—tough problems or routine production. *Hycar Chemical Company, Akron 8, Ohio.*

Our new booklet, "Everywhere in Industry", is being distributed to engineers, designers, and manufacturers in many different fields. We will be glad to furnish a copy for each member of your sales force—it will help them make better sales that will insure satisfied customers. Just let us know how many you need.

Hycar

Reg. U. S. Pat. Off.

LARGEST PRIVATE PRODUCER OF BUTADIENE TYPE

Synthetic Rubbers

Keep 'em Cool!

use PHILBLACK A

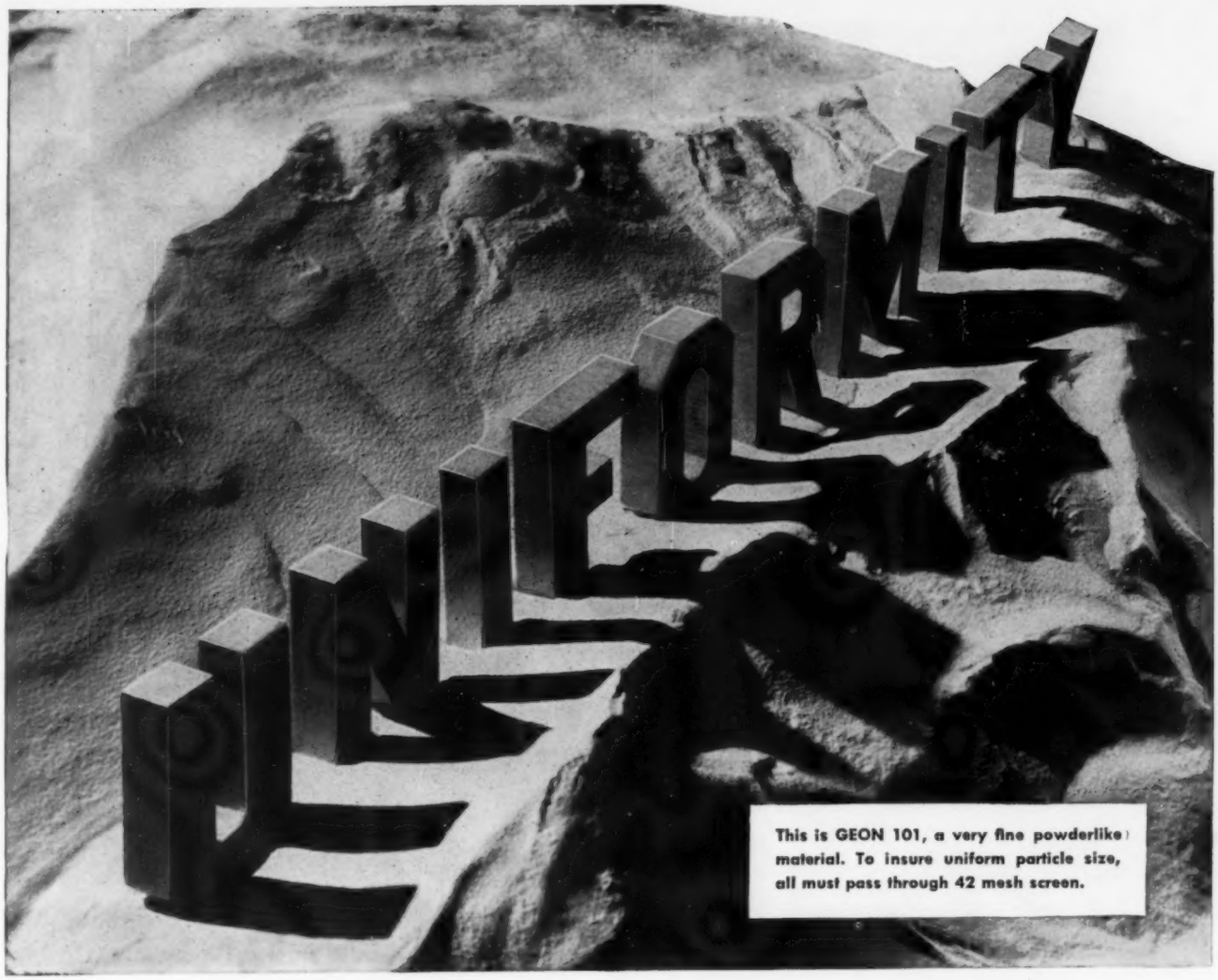
There's no need for *us* to tell *you* how desirable "low heat build-up" is to the manufacturer of tires, tubes and other rubber articles. And low heat build-up is just one of the many advantages that Philblack A offers. For low hysteresis, good abrasion, smooth extrusion, and easy processing, we are confident you can find no better black on the market.

Remember, too, that Philblack A has not only been tested in the laboratory, but also in actual use. After extensive road tests with various fleets, many manufacturers of tires and tubes are now using Philblack A with highly satisfactory results.

PHILLIPS PETROLEUM COMPANY

Philblack Division

FIRST CENTRAL TOWER · AKRON, OHIO



An important advantage offered by GEON *polyvinyl resins*

NEW users of GEON polyvinyl materials are invariably delighted to discover that these resins provide definite processing advantages resulting directly from the *uniformity* of the raw material.

For example, with GEON resins it isn't necessary to mix several batches together in an effort to get uniformity in the base material. Nor is there any need to adjust processing machinery frequently to compensate for batch-to-batch variations of the plasticized product. The formula used yesterday with one batch of GEON can be used today and tomorrow with new batches. And the finished product will be uniform — and that means satisfied customers, fewer rejects, better profit.

All this is true because manufacturing methods for GEON result in a material that is *uniform* — batch after batch after batch are all alike within close tolerances controlled by rigid specifications. For example, specific viscosity limits for GEON 101 are .52—.57. To control particle size, 100% must pass through 42 mesh screen.

Another important advantage of GEON is that the right *combination* of properties for your product can be selected to meet the specific conditions of end use. These properties include resistance to water, heat, cold, aging, wear, abrasion, sunlight, chemicals, and many other normally destructive factors. For more information write Department K K-7, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio.

Geon
Polyvinyl Materials

B. F. Goodrich Chemical Company

A DIVISION OF THE B. F. GOODRICH COMPANY

Three reasons why PHILADELPHIA Reclaimed Rubber should figure strongly in your planning

SOME rubber men are uncertain in their planning, for the present and for the future.

For years they have used Philadelphia reclaimed rubber as the stable, dependable compounding material for their rubber products. They've been able to count on its uniformity and versatility. They've been able to count on its availability.

But now they're asking "What will we do when the current supply of natural scrap rubber is used up?"

Our answer is "Don't worry" . . . In the first place—our present collected stocks of natural scrap will last at least the rest of this year—probably longer.

In the second place—these stocks will be replenished as the 142,000,000 tires now in service—most of which have natural rubber carcasses—are scrapped and replaced by new synthetic rubber tires. That's another 2 years' supply for black reclaim.

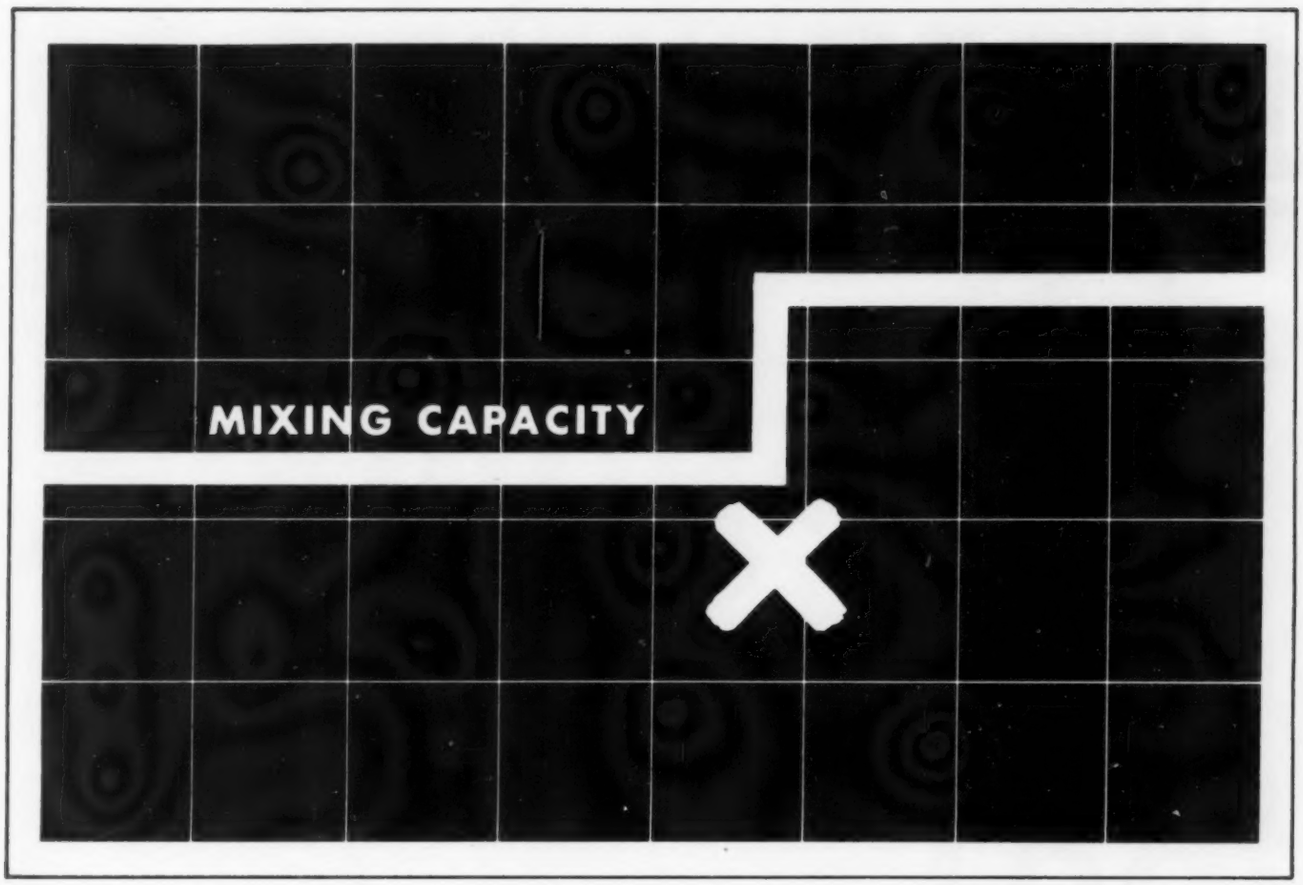
In the third place—when synthetic scrap starts coming in in quantity, Philadelphia Rubber will know what to do about it. We already have a thorough knowledge of how to reclaim synthetic scrap properly.

So we say, "Don't worry". Just let our technical staff work with you on any problems in connection with reclaimed rubber—natural or synthetic. The Philadelphia Rubber Works Company, 324 Rose Building, Cleveland 15, Ohio.

PHILADELPHIA
RECLAIMED RUBBER

X MARKS THE SPOT . . .

WHERE NAFTEX WAS ADDED



NAFTEX is a combination of SRF or HMF black and sulfur-reactive plasticizer. Through the use of NAFTEX it may be possible to increase substantially your mixing capacity without increasing your labor or equipment requirements. Our technical representatives will be glad to discuss your particular mixing and compounding problem.

NAFTEX is relatively dustless and is in the form of dry, free-flowing pellets, with the plasticizer uniformly and completely absorbed. Thus, in addition to increased mixing capacity, NAFTEX offers the added advantages of reducing carbon black dust and eliminating the handling of viscous liquid plasticizers. Technical data and laboratory samples are available.

W
-C=C-
REG. U. S. PAT. OFFICE

WILMINGTON

CHEMICAL CORPORATION

10 EAST 40TH STREET • NEW YORK 16, N. Y.

Dipex*

is economical

too!

THIS high quality anti-stick molding agent is freely soluble in water and can be applied in dilute solution by spraying, brushing or dipping, thus assuring maximum economy.

DIPEX also has the advantage of excellent color and stability for producing clean, sharp designs in white goods. It is used successfully with synthetic as well as natural and reclaimed rubber.

Send for full information and free samples.

*Reg. U. S. Pat. Off.

Stanco Incorporated

216 WEST 14TH STREET, NEW YORK 11, N. Y.

Copr. 1945, Stanco Incorporated

For greater heat resistance in Hard Rubber Products, Specify

CHEMIGUM N-1

ABILITY to withstand temperatures ranging upwards of 250° F. is just one of the many advantages of finished hard rubber products made with CHEMIGUM N-1 —Goodyear's time-proved, oil-resistant synthetic rubber. Other advantages include:

EASIER MILLING—CHEMIGUM N-1 is heat-softening at processing temperatures, even when highly loaded. It breaks down in a few minutes, reduces batch time, cuts production costs.

BETTER PROCESSING CHARACTERISTICS—handles easier; makes smoother extruded tubes and rods—smoother finish when calendered, with minimum surface shrinkage.

RESISTANT TO ACIDS, OILS AND ALKALIS.

HIGHLY ADAPTABLE—lends itself readily to modification with plasticizers, fillers and extenders.

GREAT DURABILITY—finished products have high-tensile and impact strength, in addition to superior heat resistance.

SUPERIOR FOR SPONGE—CHEMIGUM N-1 can be supplied in a low-plasticity form especially suitable for chemically blown sponge applications. Its homogeneous nature permits blowing to uniform texture without excessive milling or refining.

AMPLE SUPPLY

Goodyear's large production of CHEMIGUM N-1 now assures manufacturers of adequate supplies, in consistent plasticities and uniform quality. For complete information and samples, write: Goodyear, Chemical Products Division, Plastics and Coatings Department, Akron 16, Ohio.

• *For products requiring extreme cold resistance, ask for information on* CHEMIGUM N-2.

GOODYEAR

THE GREATEST NAME IN RUBBER

CHEMIGUM (pronounced Kem-e-gum)—T.M. The Goodyear Tire & Rubber Company

A PRODUCT OF GOODYEAR RESEARCH

WANTED

A RESEARCH DIRECTOR
TRAINED RESEARCH ASSISTANTS
SKILLED RUBBER TECHNICIANS

The Armstrong Rubber Company will erect a complete chemical and physical laboratory for research in rubber and for the development of tires and tubes and other related products. These facilities will be used in the interests of the products the company manufactures in its plants at West Haven, Conn., Natchez, Miss., and Des Moines, Iowa.

This laboratory will concern itself with the raw materials, chemicals, construction, design and all other aspects of tire and tube manufacture. Its operation will be independent of, and supplementary to, the work of existing laboratories located in each of the above plants. The location of this laboratory has not been determined and the suggestions of the laboratory director regarding its location will be respected. It will start operation as soon as essential materials are available.

We are interested in securing the services of a man qualified to head up this project from its inception. The man we seek should have substantial training and experience in this type of work preferably, but not necessarily, in the tire or rubber goods field. He should be practical, an administrator; a combination of scientist and executive. His remuneration will be attractive, fully commensurate with the position he will hold.

We are also desirous of communicating with men and women capable of assisting such a research director in various phases of his work—persons familiar with the development and application of raw materials used in our field, and others who may be qualified to work on such chemicals as we employ. Also such persons as may be suited to work on tire and tube construction, design and testing.

A third group of people we would like to reach are those who qualify as skilled rubber technicians—persons to function in our plants carrying into effect the developments of the laboratory. Such persons should have previous tire or tube manufacturing experience and be familiar with manufacturing processes common in this industry.

If you are interested in any of the positions described above write the president, Armstrong Rubber Company, West Haven 16, Connecticut, giving complete details on your personal history, education, experience and particular qualifications. If possible, enclose a small photograph. All inquiries will be treated as confidential.

This is one of the oldest and most conservative manufacturers in the rubber industry and the positions we describe represent exceptional opportunities for the right men and women.

ARMSTRONG TIRES

QUALITY TIRES AND TUBES SINCE 1912

The Armstrong Rubber Company, West Haven 16, Conn. • The Armstrong Tire & Rubber Co., Natchez, Miss. • Lake Shore Tire & Rubber Co., Des Moines, Iowa

TREATED TIRE FABRICS
BUILD BETTER TIRES
DISPERSITE
CONTROL No. 12222
DISPERSITE
DRUM No.1
Dispersions Process, Inc.
1230 SIXTH AVENUE, NEW YORK 20, N. Y.
In Canada: DOMINION RUBBER COMPANY, LTD., MONTREAL

PELLETEX & GASTEX

Semi-Reinforcing Furnace Blacks

Easy Processing . . .

Whether it's tires, footwear, hose, wire or any other product of natural or synthetic rubber, the easy processing characteristic of PELLETEX and GASTEX has given these famous semi-reinforcing furnace blacks sustained popularity throughout the high tempo of war production.

Increased capacity will be at your service for post-war products.

GENERAL ATLAS CARBON CO.

PELLETEX

GASTEX

MANUFACTURER

Pampa, Texas

Guymon, Okla.

HERRON BROS. and MEYER

DISTRIBUTOR

New York, N. Y.

Akron, Ohio

RUBBER H AND M PIGMENTS Chemicals

WHAT HAS THIS... TO DO WITH POSTWAR?

A FLAK-RIDDLED B-25 . . . but the boys have brought 'er in, just as thousands of our valiant lads have brought 'em in ever since Uncle Sam started swinging. But what has this to do with postwar? Simply that this picture illustrates in the most dramatic way we can imagine, one of the outstanding properties of the Butaprene Synthetic Rubbers—*resistance to fuels.* For many a crew of a B-25 and other ships today owe their lives to bullet-sealing fuel tanks with inner linings of Butaprene N.

Fuel resistance is only one of the many remarkable properties of these Butaprene Synthetic Rubbers that are finding new uses in industry every day. Why not see what the Butaprenes will do for you? The Butaprene Technical Staff will be glad to consult with you on any problems involving the use of synthetic rubber. Simply write XYLOS RUBBER COMPANY, Akron 1, Ohio.

BUTAPRENE N by Firestone

THE SYNTHETIC RUBBER OF A THOUSAND POSTWAR USES

RESISTS OIL · GASOLINE · HEAT · SUB-ZERO COLD · AGING · ABRASION

Copyright, 1945, The Firestone Tire & Rubber Co.

Technical Bulletin No. 12 — on the Compounding of GR-S with Substantial Loadings of Zinc Oxide

Effect of Moisture on Zinc Oxide–GR-S Compounds

ORIGINAL RESULTS

Time of Cure Min. at 45 Lb.	Tensile Strength psi.	Per Cent Elongation	Modulus—Load (psi.) for Elongation of: 200%	300%	400%	500%	Permanent Set
NO WATER							
15	1370	785	150	190	265	380	.24
30	1075	635	190	270	345	540	.18
45	1180	620	190	265	380	610	.19
60	1065	580	190	265	420	645	.17
90	1450	640	230	305	420	685	.21
120	1075	585	230	310	425	655	.17
5% WATER ON THE POLYMER							
15	1240	700	195	350	465	660	.57
30	1065	565	265	380	535	840	.37
45	1240	550	340	455	685	1065	.43
60	1550	590	310	465	660	1010	.47
90	1540	560	345	500	770	1230	.42
120	1450	525	390	550	825	1290	.36

	Time of Cure Min. at 45 Lb.	Goodyear-Healey Pendulum: Indentation in mm.	Goodyear-Healey Pendulum: Per Cent Rebound	Compression Fatigue (Goodrich Flexometer)*: Per Cent Initial Comp.	Running Time and Per Cent Permanent Set	Max. Temp. Rise ° C.	Dynamic Compression: Initial	Dynamic Compression: Final	Cut-Growth Resistance: Inches Failure 6,000 Cyc.	Cut-Growth Resistance: Inches Failure 27,000 Cyc.
NO WATER	90	7.81	59.6	20.8	15′–4.1	16.2	13.2	16.1	.10	.39
5% WATER	90	7.24	59.3	18.8	15′–4.1	17.6	10.5	13.2	.11	.43

* Test Conditions: 100 lb. load. 0.15" stroke. 100° C. Oven Temp.

THE effect of moisture on the curing rate of GR-S with special reference to Carbon Black compounds has been reported.** In Zinc Oxide compounds with 100 part loadings, the mill addition of 5 parts of water on the polymer not only increases curing rate, but gives substantial increases in ultimate tensile strength and modulus. In spite of the fact that the permanent set at break is increased by the water addition, the pendulum rebound, heat generation and cut-growth results compare favorably with the control. The water was added after all other ingredients except the accelerator. Further work on the effect of moisture is in progress, and the results will be reported later.

** Braendle and Wiegand, IEC 36, 725 (1944).

COMPOUND No. 12

GR-S	100.0
Sulfur	3.5
MBT	2.0
Coumarone-indene resin	7.5
E.L.C. Magnesia	5.0
Zinc Oxide	100.0
Water	variable

Uniform Quality HORSE HEAD ZINC OXIDES

THE NEW JERSEY ZINC COMPANY

160 FRONT STREET NEW YORK 7, N. Y.

Products Distributed by THE NEW JERSEY ZINC SALES COMPANY

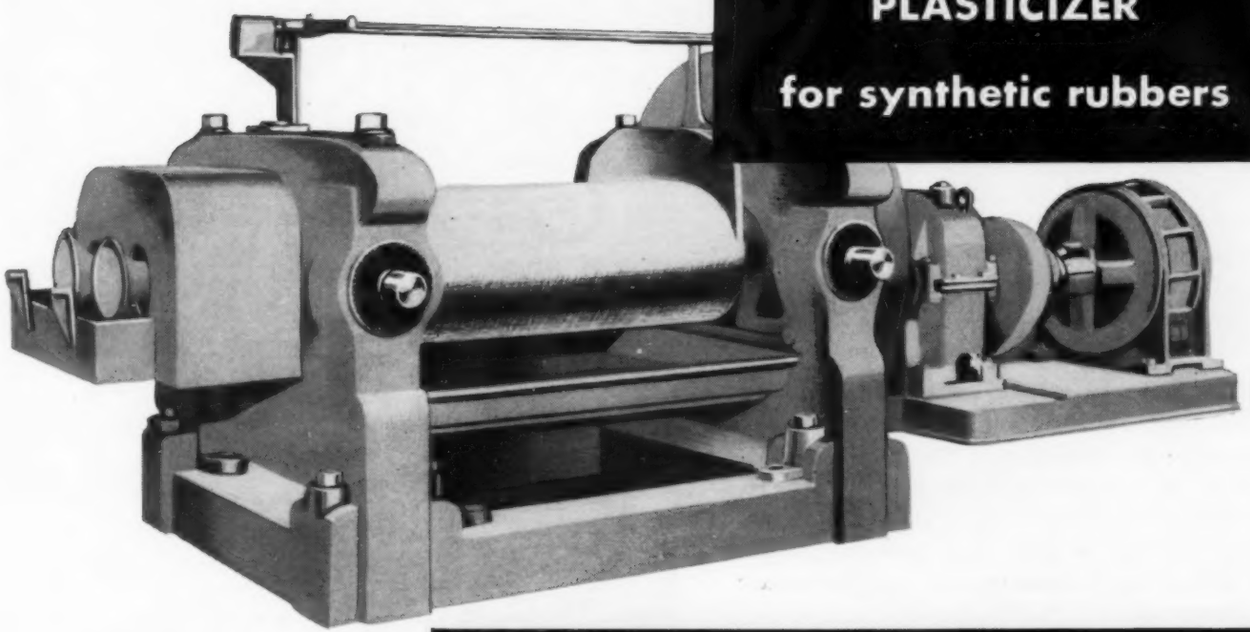
NEW YORK CHICAGO • CLEVELAND SAN FRANCISCO

WORLD'S LARGEST PRODUCER OF SYNTHETIC RESINS

RCI

answering your demand

for a trustworthy PLASTICIZER for synthetic rubbers



RCI Controlled-Quality

DIBUTYL PHTHALATE

RCI has resumed quantity production of the proved plasticizer for Vinyl, Neoprene and Buna N types of synthetic rubber—dibutyl phthalate. And with the return of this basic chemical to RCI's Line of Raw Materials comes reassurance of uniformity from batch to batch because RCI's system of control guarantees constant quality. Meeting Army Specification 50-11-61A and Army-Navy Specification AN-O-D-361, RCI Dibutyl Phthalate is thoroughly dependable. For further information write direct to the Sales Department.

Saturday Evenings at 8:30 (E.W.T.)
You Will Enjoy RCI's
"Symphony of the Americas"
Via Mutual Network Stations

ARMY E NAVY

REICHHOLD CHEMICALS, INC.

General Offices and Main Plant, Detroit 20, Michigan

Other Plants: Brooklyn, New York • Elizabeth, New Jersey • South San Francisco, California • Tuscaloosa, Alabama • Liverpool, England • Sydney, Australia

SYNTHETIC RESINS • CHEMICAL COLORS • INDUSTRIAL PLASTICS • INDUSTRIAL CHEMICALS

Custom tailor for a suit of armor

APPLYING wire braided armor or shielding to tubing, conduit or hose, is a custom tailoring job. Braiding can be applied directly to material to be covered, or the metal braid can be furnished in suitable lengths for the user to apply in his own plant during assembly operations.

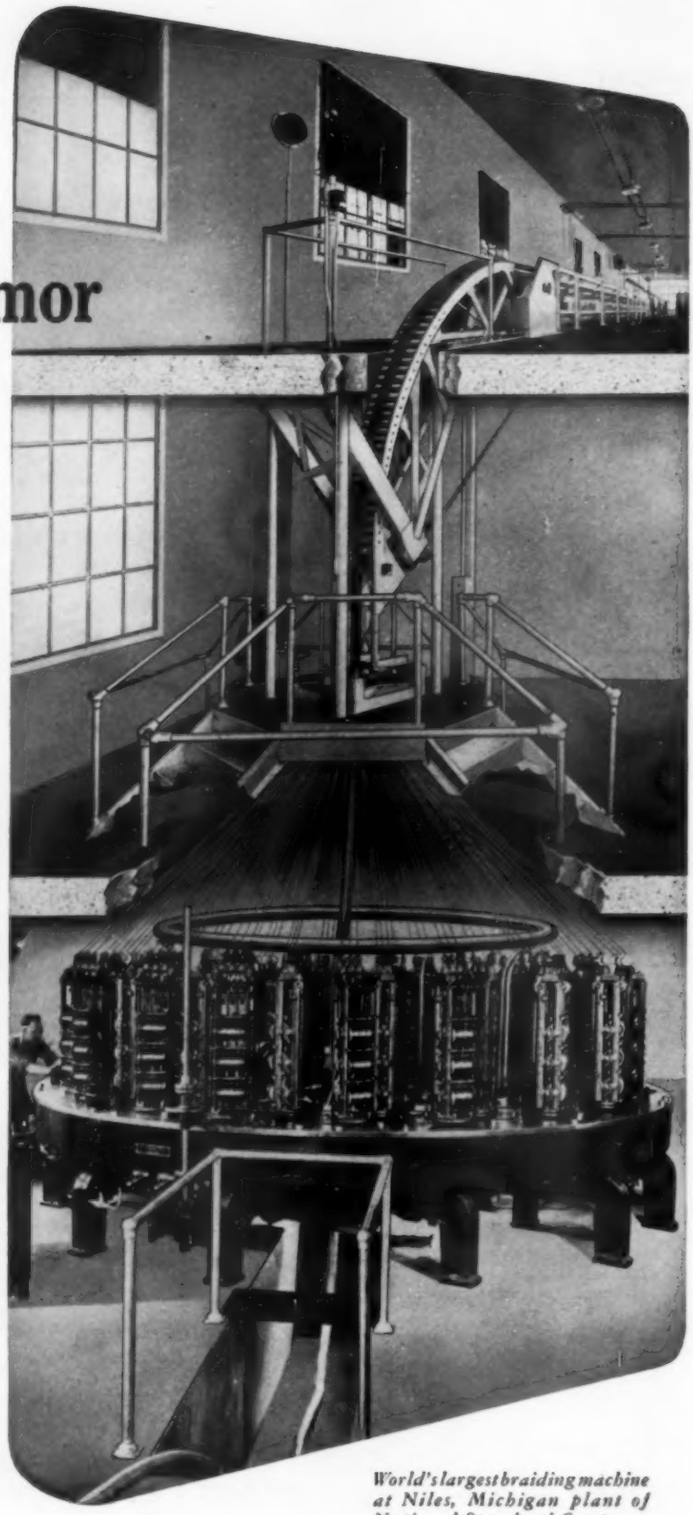
To provide the desired flexibility and other characteristics such as uniform coverage, resistance to mechanical abuse, resistance to elongation, or enlargement of diameter, braiding wire must be applied at precisely the correct angle and there must be no variation from this . . . from start to finish of the job.

That's why for fine radio wire 1/16" in diameter, or 16" steam expansion joints, more and more companies are calling upon National-Standard for their wire braiding work. For, we at National-Standard have the knowledge and experience necessary to give you a custom tailored job of braiding to meet exactly your particular requirements.

Today at National-Standard we have machinery available to braid steel, brass, copper, stainless steel, and monel metal. Let our 38 years of experience in the wire and wire fabricating industry help *you* with your braiding problem.

BUY AND KEEP WAR BONDS AND STAMPS

NS
NATIONAL-STANDARD Company
NILES, MICHIGAN



World's largest braiding machine at Niles, Michigan plant of National-Standard Company.

Divisions of National-Standard Company

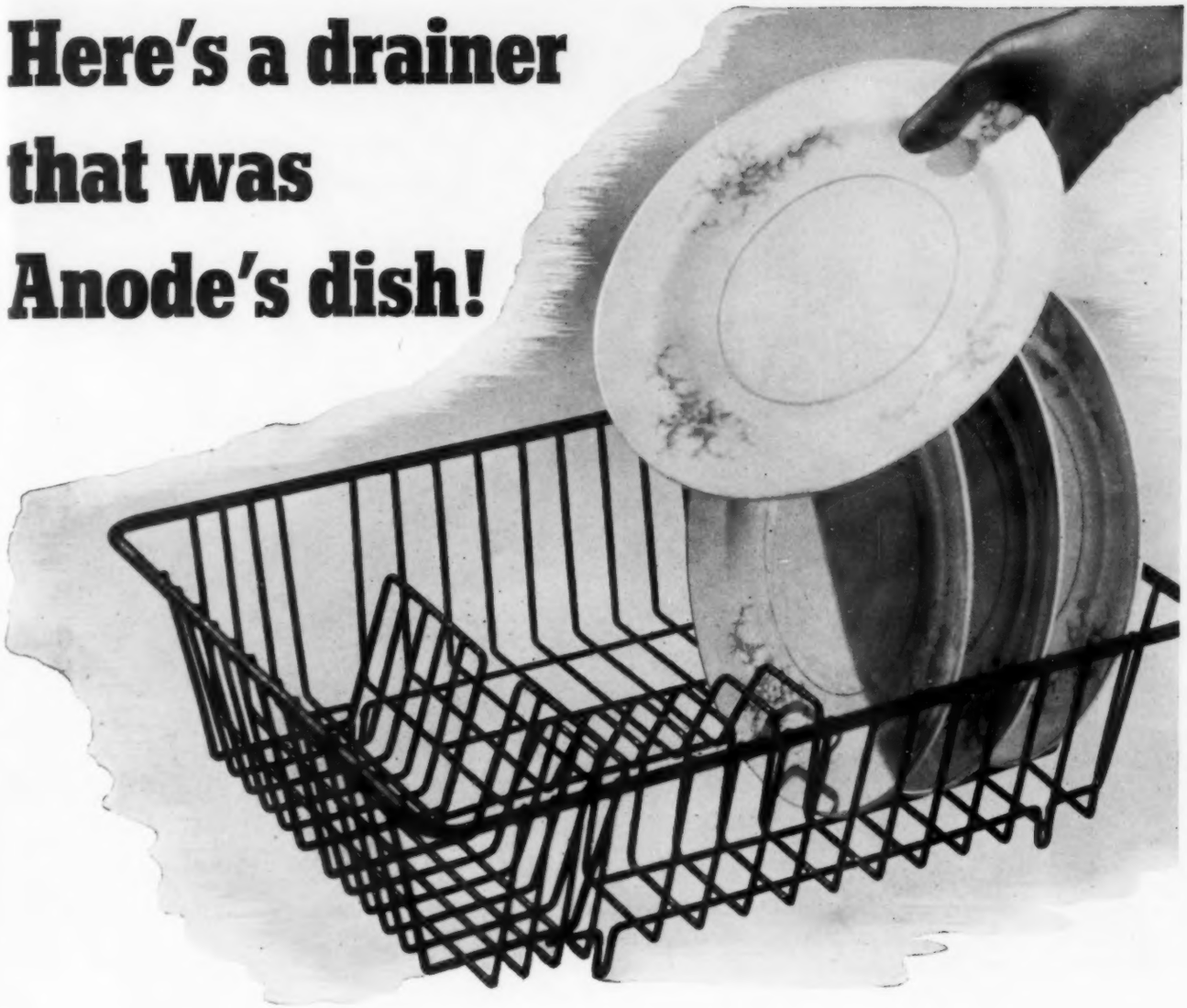
NATIONAL-STANDARD CO.
Niles, Mich.
TIRE WIRE, FABRICATED BRAIDS AND TAPE

THE ATHENIA STEEL CO.
Clifton, N. J.
COLD ROLLED, HIGH-CARBON SPRING STEEL

WORCESTER WIRE WORKS
Worcester, Mass.
ROUND STEEL WIRE, SMALL SIZES

WAGNER LITHO MACHINERY CO.
Hoboken, N. J.
LITHOGRAPHING AND SPECIAL MACHINERY

Here's a drainer that was Anode's dish!



Synthetic latex mix provides quick answer for coating metal frame

PROVIDING a material for coating the dish drainer in the picture was no great problem to American Anode. When it was proposed on an experimental basis, Anode research men dipped into their truly great store of experience and came up with an immediate answer, a typical rather than an exceptional performance.

The material selected was a special oil resistant latex mix for food, oil and acid resistance; an Anode mix for ease of application, and for the processing safety that is present with all water systems as opposed to solvent cements.

American Anode mixes and pastes are available in practically all types of latices in a broad range of concentrations. Their usefulness extends over a wide range of products from oxygen masks to dipped canvas gloves, from terrain maps to meteorological balloons, from doll skins to surgical tubes.

American Anode pioneered the work with rubber and synthetic latices and mixes in this country. Continuing research and development has enabled them to maintain their leadership in the most literal sense. *Practical* laboratory specialists with many years' experience can give you authoritative answers to your questions concerning any dipping, coating, cementing or spraying application. Other specialists in *customer service* will see that your needs are filled promptly and expertly. American Anode Inc., 60 Cherry Street, Akron, Ohio.

AMERICAN ANODE
INCORPORATED
NATURAL AND SYNTHETIC RUBBER LATICES, WATER CEMENTS AND SUSPENSIONS

. . For Better Butyl Compounds

Retarder-Activator: Prevents scorching at processing temperatures, but activates at current temperatures.

Increases raw stock strength with all types of pigmentation.

Faster, smoother tubing and non-sagging stocks.

Aids in dispersion of all pigments and particularly channel blacks and hard clays.

Lowers temperature, power consumption and time of Banbury mixing.

Exceptional cure leveler for fast curing stocks.

Improves resistance to tear, aging and cold flow or "growth" of cured articles.

Literature and samples may be obtained from

SALES REPRESENTATIVES

BOSTON **L. G. Whittemore, Inc.**
131 Beverly St.
Boston 14, Mass.
Phone Capitol 8910

NEW YORK **Robert I. Webber**
52 Vanderbilt Avenue
New York 17, New York
Phone MUrray Hill 3-6008

TRENTON **H. N. Richards Co.**
1203 East State Street
Trenton, New Jersey
Phone Trenton 3-4186

The
CALDWELL COMPANY
2412 FIRST CENTRAL TOWER
AKRON 8, OHIO

Echoes of a Quarter Century

During the years from 1920 to 1945 radio has grown from an infant to a huge industry serving and influencing the lives of millions, and is now reaching into new fields through television and radar.

A similar growth has occurred in the chemical industry in America during these years. Founded in 1920, Witco has grown steadily with this industry, playing an increasingly important role in the development of new and finer chemicals and better processing methods for the manufacture of various products. And during the war Witco's experience has been greatly enhanced by the development and adaptation of special materials to war demands. Particularly valuable are the company's contributions in the fields of rubber, sealing compounds, surface coatings, printing inks and asphalt products.

If you use carbon black or other pigments, asphalt specialties, colors, fillers or chemicals, Witco can meet your needs and help you apply these materials efficiently. Our research laboratories are at your service.

WITCO CHEMICAL COMPANY

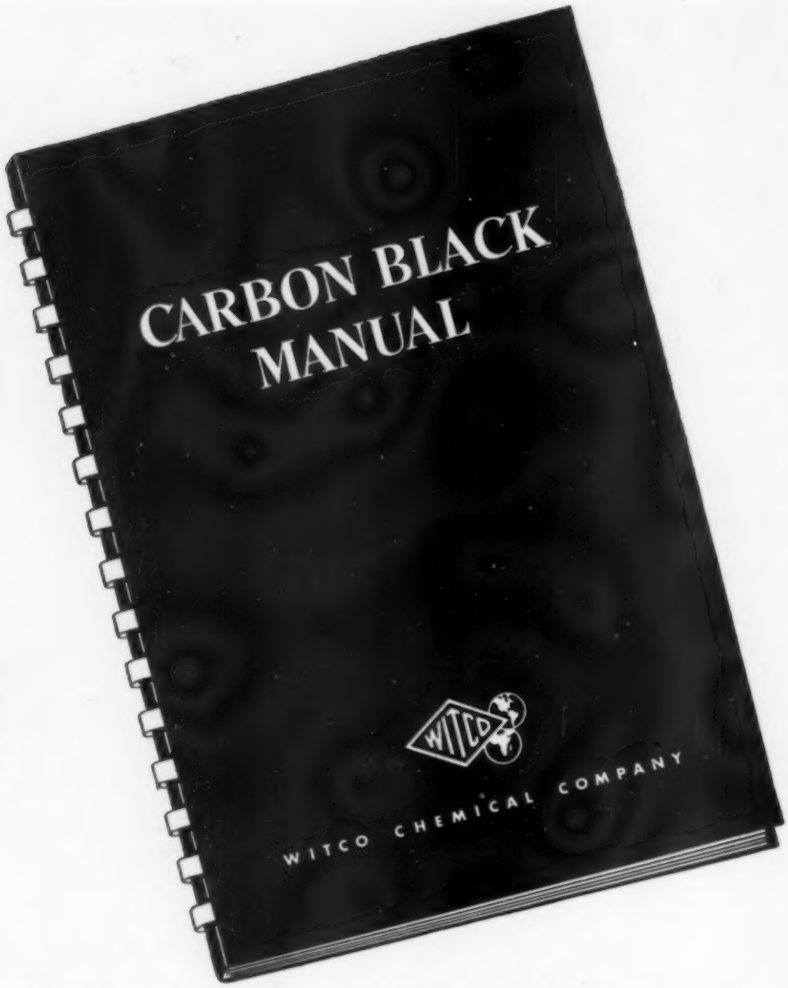
MANUFACTURERS AND EXPORTERS

[Formerly Wishnick-Tumpeer, Inc.]

295 MADISON AVENUE, NEW YORK 17, N. Y.

Boston • Chicago • Detroit • Cleveland • Akron • London

NEW... AND COMPLETE!



Here is the new Witco Carbon Black Manual, a comprehensive, up-to-date text on the properties and applications for the wide range of Channel and Furnace type Carbon Blacks manufactured and supplied by Witco.

This new manual contains carefully compiled information of immediate and lasting value to both rubber compounders and buyers of rubber processing materials.

It is yours for the asking.

COMPLETE, too, are Witco's lines of both Channel and Furnace Type Blacks. They cover carbon black need for the compounding of both natural and synthetic rubber. In addition, Witco offers wide variety of other materials for use in rubber production, among which are:

- **FILLERS**
- **SOFTENERS**
- **DISPERSING AGENTS**
- **ACCELERATORS**
- **ACCELERATOR ACTIVATORS**
- **COLORS**

AND OTHER PRODUCTS

Full information on these products is contained in our booklet, WITCO PRODUCTS, which is also yours for the asking.

CONTINENTAL CARBON COMPANY

MANUFACTURER

[CONTINENTAL CHANNEL AND FURNACE BLACKS]

WITCO CHEMICAL COMPANY

DISTRIBUTOR

[FORMERLY WISHNICK-TUMPEER, INC.]

MANUFACTURERS AND EXPORTERS

295 MADISON AVENUE, NEW YORK 17, N. Y. • Boston • Chicago • Cleveland • Akron • Detroit • London

FOR IMPROVEMENT IN

- Tensile
- Elongation
- Resistance to Abrasion
- Resistance to Cut-Growth

● — **RESINEX is bringing definite improvements to these important physical properties in compounds used for a wide variety of products. As a plasticizer, its softening action speeds milling and smooths out stocks for better extrusion. RESINEX is brown in color and may be freely used in brown, tan and chocolate-colored stocks. . . It is particularly recommended in soles, heels and mechanical goods, and is available for immediate large-volume uses.**

RESINEX

STANDARD Chemical Company

General Offices: AKRON 8, OHIO

New England: 335 Chamber of Commerce Bldg., Boston, Mass.
Mid-West: 2724 W. Lawrence Ave., Chicago, Ill.

PROCESSING . . .

In addition to lowering the material cost, one of reclaimed rubber's important uses is to help PROCESSING.

Trouble free PROCESSING is of greater importance today than ever before.

Proper selection and use of reclaimed rubber can be of material aid in overcoming your PROCESSING troubles.

Let Pequanoc's Standards and experience help you.

PEQUANOC RUBBER CO.

QUALITY RECLAIMS FOR SPECIFIC PURPOSES

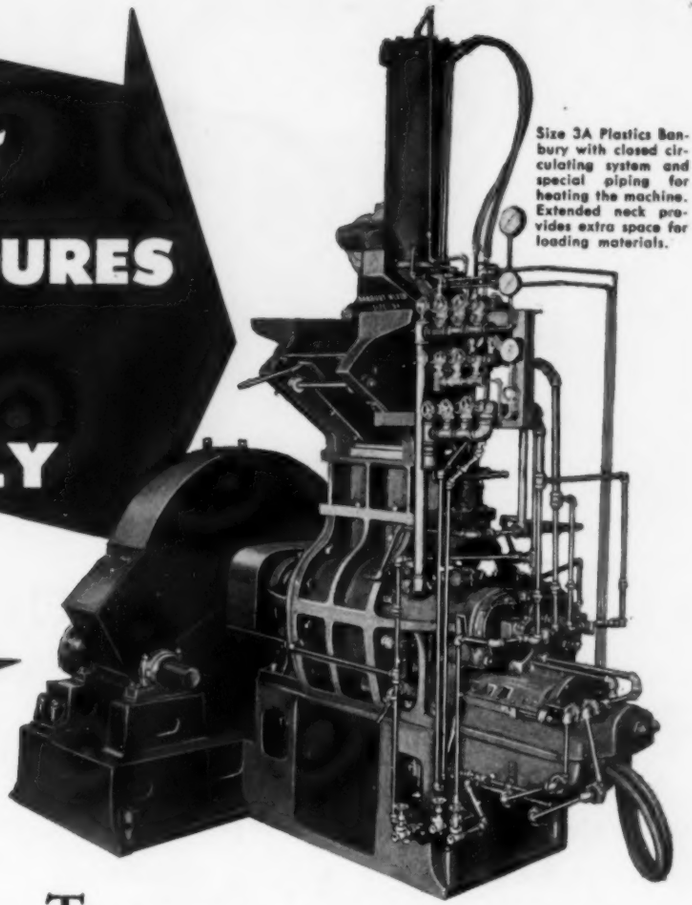
Factory and Main Office: BUTLER, NEW JERSEY

SALES REPRESENTATIVES

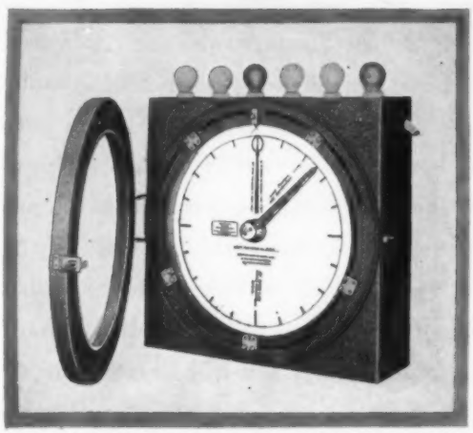
NEW ENGLAND
Harold P. Fuller
1162 Park Square Bldg.,
Back Bay, Boston, Mass.

EUROPEAN
Burnett & Co. (London) Ltd.
46 Herga Court
Harrow-on-Hill, Middlesex, England

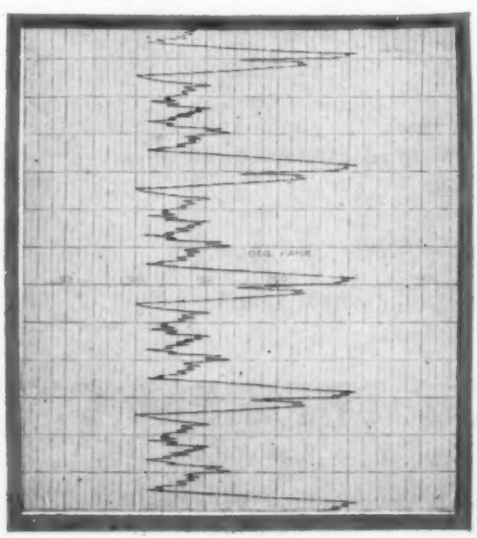
Here's how MIXING PROCEDURES CAN BE AUTOMATICALLY CONTROLLED



Size 3A Plastics Banbury with closed circulating system and special piping for heating the machine. Extended neck provides extra space for loading materials.



Timing device with typical instruction chart. Door opened to show contactors which flash signal lamps at any selected stage of mixing cycle.



Section of strip chart from recording potentiometer pyrometer, showing uniformity of operating procedure during successive batches.

The elimination of expensive and variable hand operations—*the transfer of skill to mechanism*—is probably one of the greatest services performed for industry by the Banbury Mixer. By use of the devices described below, each operation in the mixing procedure can be automatically controlled—and recorded. All guess work is eliminated . . . dependence on the operator's judgment becomes unnecessary.

TIMING DEVICE

A telechron-motor-operated timing instrument is supplied with all production size Banburys. Its removable paper dials, or charts, are graduated by minutes for marking just how long to allow for each operation. Contact arms, set to correspond with the instructions on the dial, close a circuit as each stage of the operating cycle is completed, signalling the operator automatically by flashing one of a series of lamps on top of the instrument. At the completion of each batch, the pointer can be returned to zero and the procedure repeated; when the formula is changed, a new chart can be inserted.

TEMPERATURE RECORDER

When the deciding factor in a mixing process is temperature, the electrically actuated recording potentiometer pyrometer, supplied with each production Banbury, can be used to control the operation of the mixer, automatically discharging the batch when a predetermined maximum temperature has been reached. This is an important advantage in mixing sensitive products which have a definite temperature limit.

AUTOMATIC DISCHARGE CONTROL

Optional equipment includes an automatic discharge control, operated either by the timing device or the temperature control. The mechanism automatically opens the door and keeps it open long enough for complete discharge of the batch.

For further details of these and other features of the latest Banbury Mixers, write for a copy of NEW, 32-page bulletin No. 180. No cost . . . no obligation.

FARREL-BIRMINGHAM COMPANY, INC., ANSONIA, CONN.
Plants: Ansonia and Derby, Conn., Buffalo, N. Y. Sales Offices: Ansonia, Buffalo, New York, Pittsburgh, Akron, Los Angeles.

Farrel-Birmingham

New Compounds for...

FLOCKING

A completely satisfactory synthetic adhesive for flocking has long been a major problem to rubber chemists and manufacturers. We believe our new synthetic latex base compounds will overcome all of the previous difficulties no matter what method of application is used: — spraying, spreading or doctoring.

Adaptable to both cotton and rayon flock, these compounds are also non-inflammable, water-resistant, and can be pigmented to match the color of the flock or base material. A further advantage is the elimination of any additional extending, mixing, or dilution at your plant: — This General Latex compound is shipped in the form of an aqueous dispersion *ready for use.*

HEAT SEALING

General Latex has developed not one, but *a whole new family of compounds* for heat sealing paper, textiles, imitation leather, and associated products. The base is synthetic latex, but the other ingredients are varied in the compounding to fit the particular requirements of temperature, penetration, strength of bonding, flexibility, adaptation to unlike surfaces, and all other factors pertinent to the application.

These compounds are not carried in stock but can be supplied on short notice, tailor-made to your individual requirements. For a thorough analysis of any heat sealing problem you may have, we suggest that you get in touch with our laboratory.

GRS latex types, 2, 3 and X-160, normal and concentrated, available from stock.

A Complete Service to Manufacturers

RESEARCH • MATERIALS • ENGINEERING • MANUFACTURE

General Latex & CHEMICAL CORP.

666 MAIN STREET, CAMBRIDGE, MASS.

Agents for Rubber Reserve Company for storage and distribution of natural rubber latex. Distributors for Rubber Reserve Company for synthetic latex. Operators of the Government-owned Baytown, Texas, synthetic rubber plant in collaboration with the General Tire & Rubber Co.

An old story with a new twist

In the rayon industry, famed for its many new developments, tire cord made of rayon yarn is now an old story but Industrial gives it a new twist–an UP-twist.

Thanks to the exclusive properties of "Continuous Process", Industrial's Tyron Yarn is delivered, fully stretched and processed, on bobbins instead of the large beams used in conventional methods.

Hence, Tyron may be UP-twisted, dispensing with the rings, travellers, and greasing of the down-twist process. Our way, the yarn travels only a few feet, receives a uniform twist under less tension, is cleaner, subject to less surface abrasion, and is wound onto large knot-free packages that require no separate spooling operation.

UP-twisting is a typical example of many contributions of the "Continuous Process" to greater rayon-making efficiency, and a commentary on the skill and resourcefulness Industrial is devoting to chemical, mechanical and textile phases of rayon production.

it's a new twist in UP-twisting Remember it!

Industrial RAYON CORPORATION
CLEVELAND, OHIO
NEW YORK OFFICE 500 FIFTH AVE

MAKERS OF
*Spun-lo RAYON YARN AND CLOTH
and
*TYRON YARN, CORD AND FABRIC

*Reg. U. S. Pat. Off.

COMMERCIAL APPLICATIONS OF ANTISOL

Service Station Pneumatic Signal Hose

4% Antisol **No Antisol**

RUBBER H AND M PIGMENTS Chemicals

Photographs of service station showing hose in service and close up of hose with and without 4 per cent of Antisol after six months of service. Samples were bent around a mandrel before photographing to show cracking.

HERRON BROS. & MEYER
82 BEAVER ST., NEW YORK 5, N. Y.
516 OHIO BUILDING, AKRON, OHIO
SUPPLIERS OF RUBBER CHEMICALS

EEMCO Presses

★ Made in small 12" x 12" Laboratory Press and up to all larger sizes necessary for production needs, EEMCO hydraulic presses are especially designed for rubber and plastics processing. They can be equipped with pull-back or push-back cylinders and knockouts for ejecting molded pieces, if desired. Write for quotations, giving size of platen and number of openings required for the press or presses needed.

★ ★ ★

Sales Representatives

MIDWEST
HERRON & MEYER OF CHICAGO
38 South Dearborn St.
CHICAGO 3, ILL.

OHIO
DUGAN & CAMPBELL
907 Akron Savings & Loan Bldg.
AKRON, OHIO

EASTERN
H. E. STONE SUPPLY CO.
OAKLYN, N. J.

★ ★ ★

MANUFACTURERS OF MILLS • REFINERS • WASHERS • EXTRUDERS
STRAINERS • PRESSES • CALENDERS • TUBERS • CRACKERS

EEMCO — Erie Engine & Mfg. Co.

953 EAST 12th ST., ERIE, PENNA.

The Pace of Victory Permits Only A Congratulatory Handshake!

American Industry well merits a decoration for its brilliant record in the Mighty 7th! But, as our newly decorated Pacific heroes quickly return to combat, so industrial leaders aren't resting on their laurels. ***Back into Bond action***—they are now busy consolidating recent Payroll Savings Plan gains!

First, many executives are now patriotically working to retain the substantial number of new names recently enrolled during the 7th War Loan. By selective resolicitation, they are urging all new subscribers to maintain Bond buying allotments.

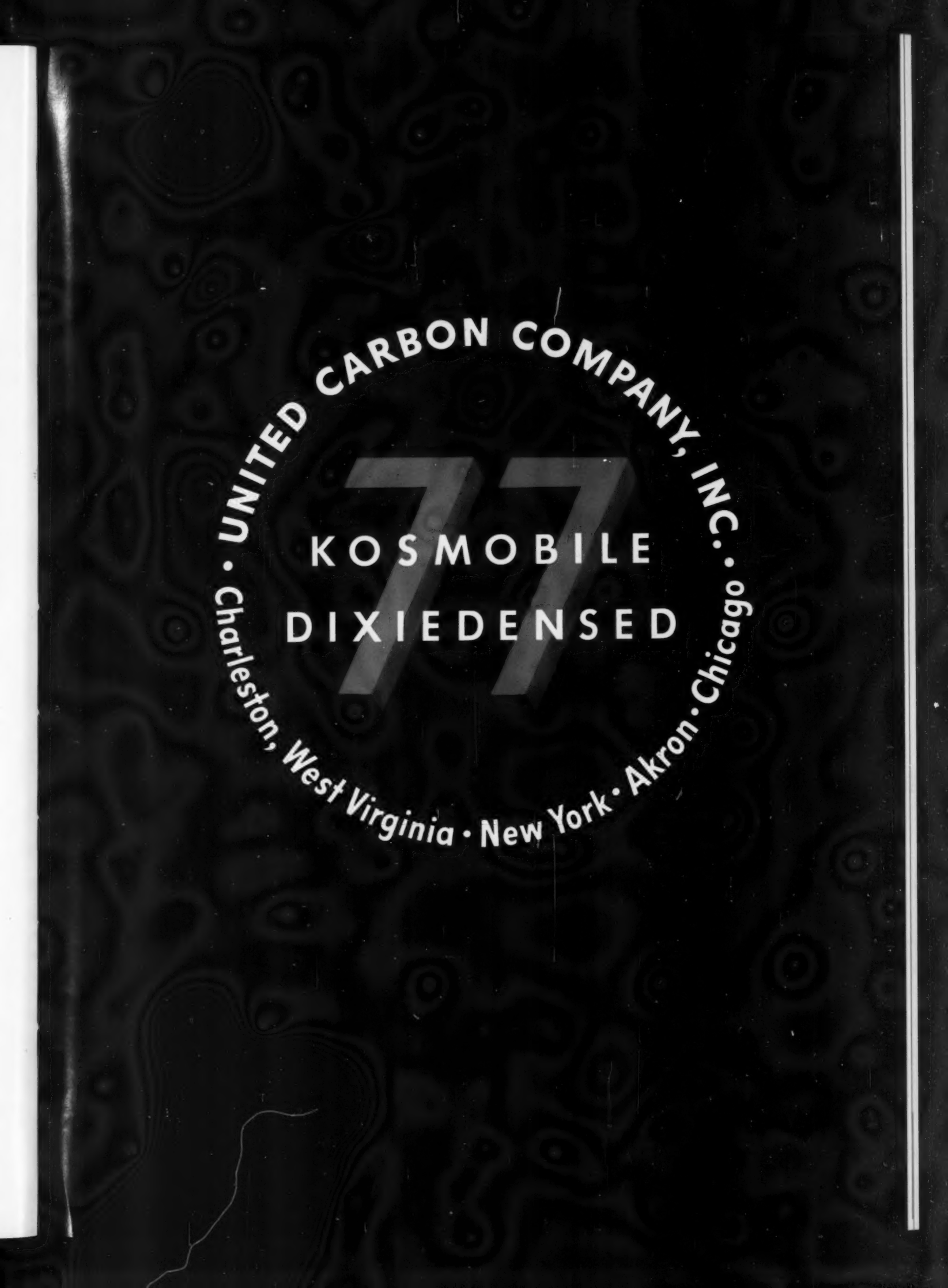
Second, many are also employing selective resolicitation to urge every worker who increased his or her subscription in the 7th to continue on this wise, saving-more-for-the-future basis.

Help to curb inflationary pressures and harvest peacetime prosperity by holding the number of Payroll Savings Plan subscribers—and amounts of individual subscriptions—to the mark set in the Mighty 7th!

The Treasury Department acknowledges with appreciation the publication of this message by

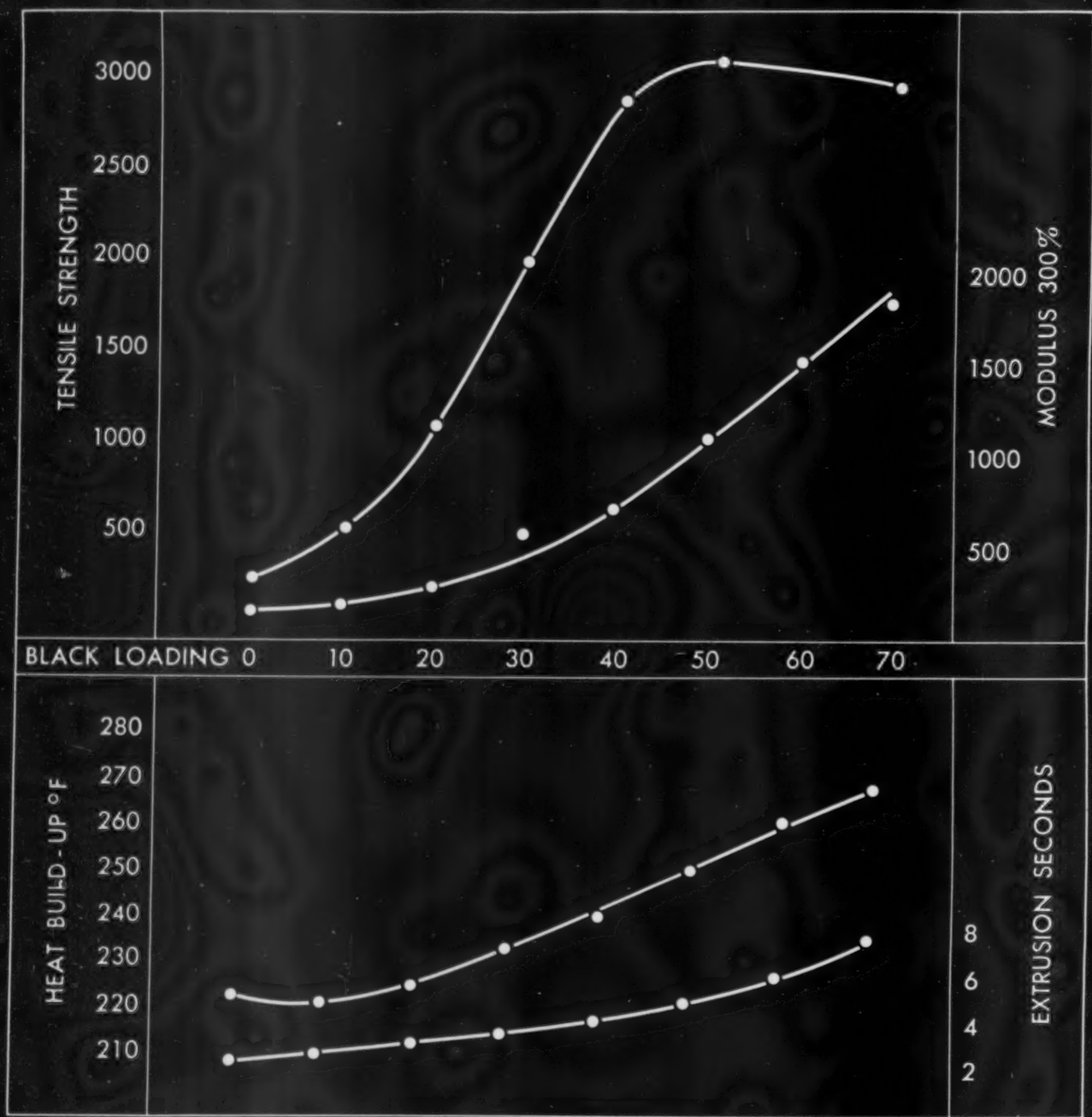
THE RUBBER AGE

★ *This is an official U.S. Treasury advertisement prepared under the auspices of Treasury Department and War Advertising Council* ★


UNITED CARBON COMPANY, INC.
77
KOSMOBILE
DIXIEDENSED
Charleston, West Virginia • New York • Akron • Chicago

EFFECT OF DIXIEDENSED 77 • KOSMOBILE 77

EASY PROCESSING, CARBON CHANNEL BLACK ON THE REINFORCEMENT OF GR-S



RESEARCH DIVISION

UNITED CARBON COMPANY, INC.

CHARLESTON, WEST VIRGINIA

ANGIER

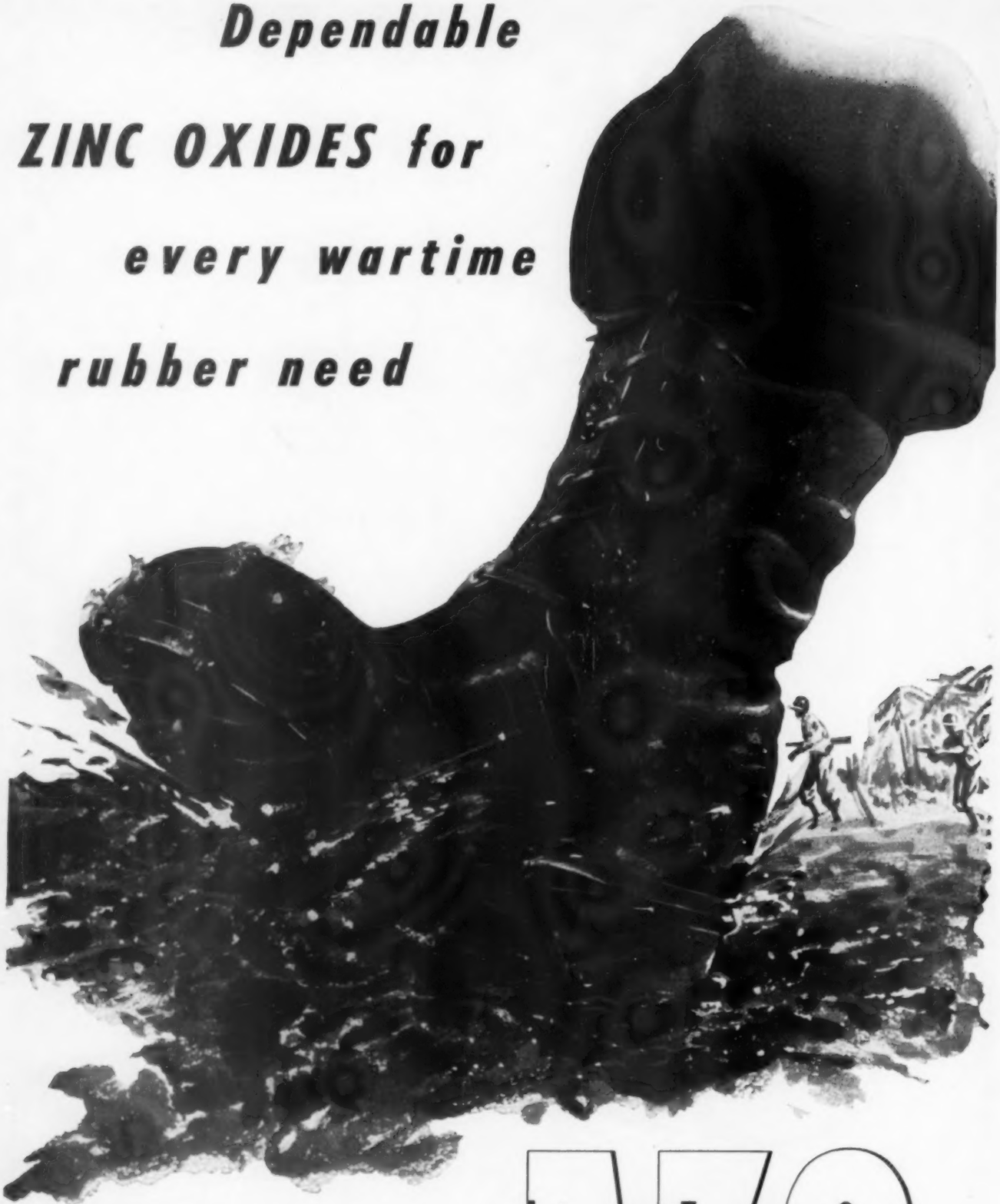
Adhesives Coatings
Cements Laminants

Laboratory controlled specific formulations to meet your needs in manufacturing better products of *leather, fabric, metal, wood, glass, paper, plastics* — used individually or in combination.

Write us in detail about your specific problems.

GOOD PROCESSING IN YOUR PLANT STARTS IN OUR LABORATORY

Dependable ZINC OXIDES for every wartime rubber need

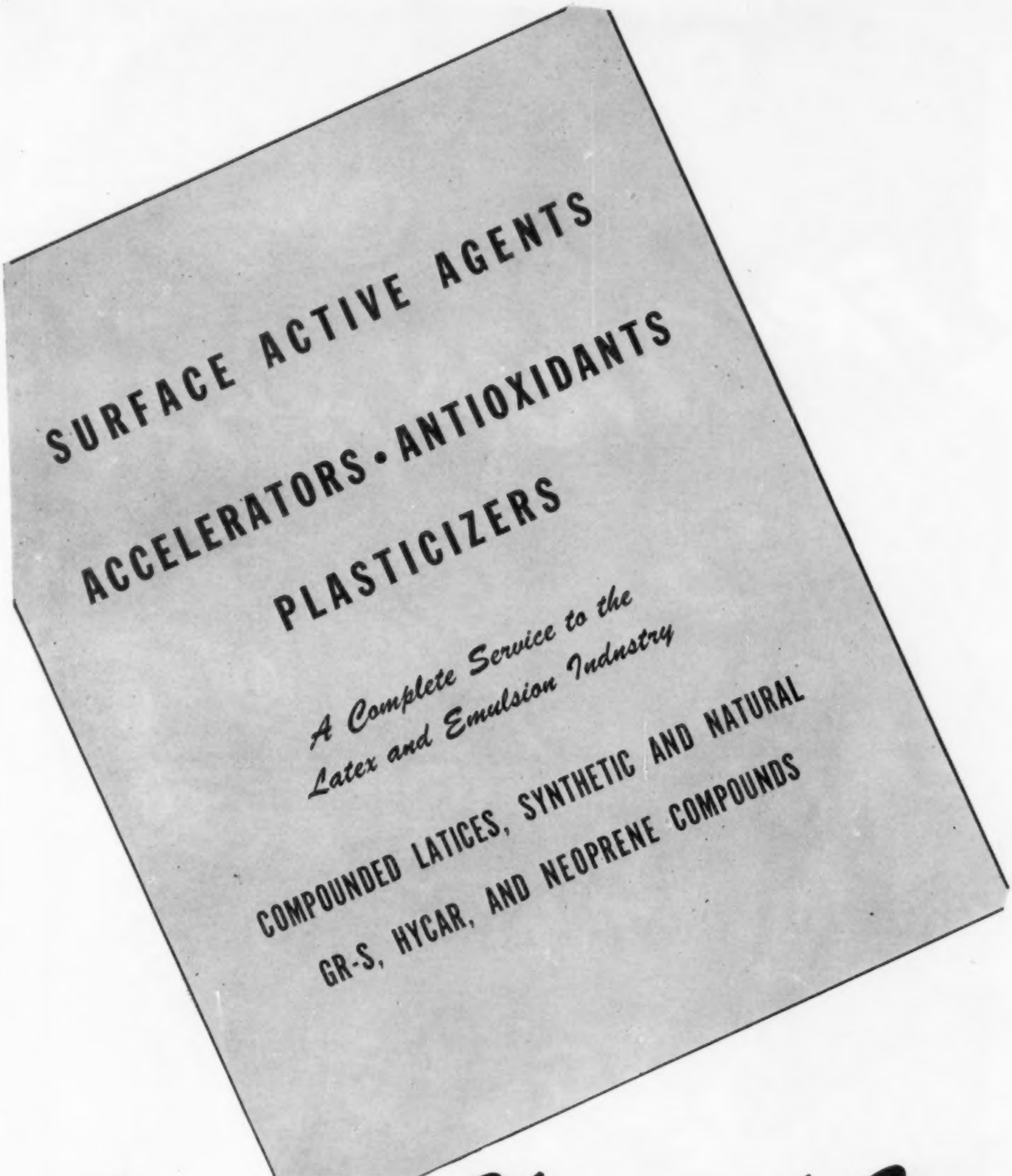


AZO

ZINC OXIDES

AMERICAN ZINC SALES CO., Distributors for AMERICAN ZINC, LEAD & SMELTING CO.

COLUMBUS, OHIO - CHICAGO - ST. LOUIS - NEW YORK



Agawam Chemicals Inc.

TRADE AGCHEM MARK

WEST SPRINGFIELD
MASSACHUSETTS

FRICTION HEAT

ONE of the major reasons why our war tire program is absorbing such a tremendous poundage of rayon for tire cords is because tires of this construction generate less friction heat. As you know, friction heat eats up rubber...weakens the tire. Its effect is so severe that a reduction of only a few degrees means a marked improvement in tire performance.

The molecular structure and the physical uniformity of rayon result in better heat dissipation. Because of this, a rayon-cord tire will naturally run cooler by 10°F.... in tires of *equal thickness.* However, the thicker the tire, the hotter it runs. Since rayon retains its tensile strength better at high running temperatures, fewer plies are required for comparable service. Thus, rayon cord means an even further reduction in the problem of tire heat.

This ability of rayon-cord tires to run cooler is one of the scientific explanations for the longer life, the greater mileage and the increased safety they give in actual operation.

Source of data: Hearings before a Special Committee Investigating the National Defense Program. United States Senate — Seventy-eighth Congress, First and Second Sessions

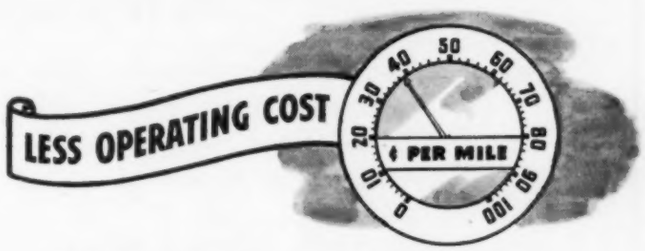
Less with Rayon Cord

"RAYON-CORD SYNTHETIC TIRES GIVE TWICE THE MILEAGE BEFORE SCRAPPING"...

Eastern Mass. St. Ry. Co.,
Winner of ME pennant for 6th consecutive year

H. I. SULLIVAN, *Vice President* of this largest bus operator in New England, reports: "Records we have recently begun to keep show 74 S-7 synthetic tires with rayon cord averaged 36,400 miles before scrapping, as compared with 16,400 miles for 25 S-7 tires with other cord. Furthermore, we consider that rayon cord has been an important factor in sustaining our outstanding record for safety and maintenance efficiency."

Less friction heat, higher tensile strength and greater uniformity of rayon tire cords mean more safety at high running speeds.



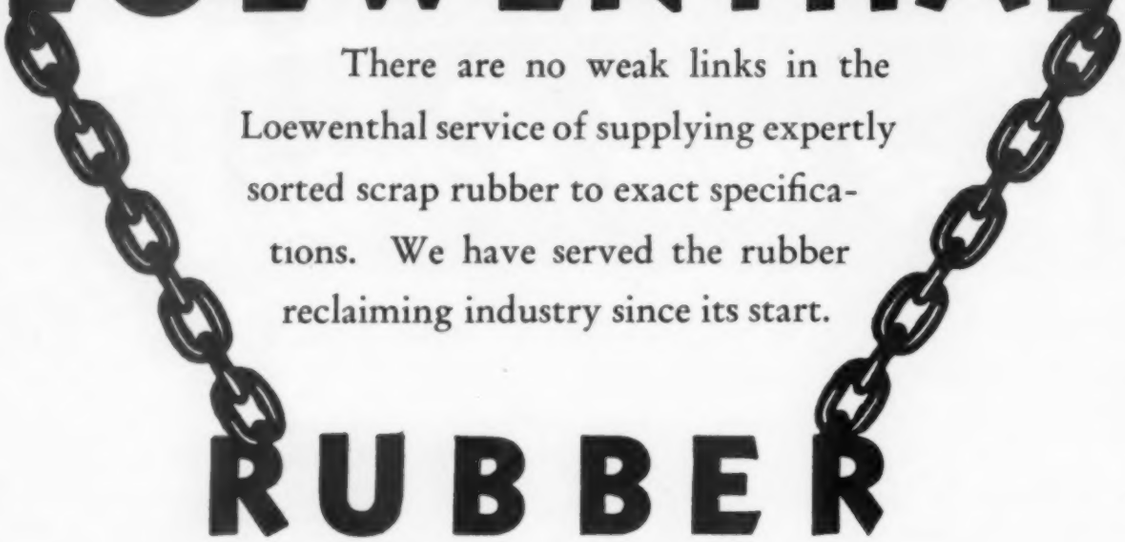
Rayon-cord tires give longer life, greater mileage . . . reduce impact failures, road delays, tire renewals.

AMERICAN VISCOSE CORPORATION

America's Largest Producer of Rayon Tire Cord, Yarn, and Staple Fiber

Sales Offices: 350 Fifth Avenue, New York 1; Providence, R. I.; Charlotte, N. C.; Philadelphia, Pa.
Plants at: Marcus Hook, Pa.; Roanoke, Va.; Parkersburg, W. Va.; Lewistown, Pa.; Meadville, Pa.; Nitro, W. Va.; Front Royal, Va.

LOEWENTHAL



There are no weak links in the Loewenthal service of supplying expertly sorted scrap rubber to exact specifications. We have served the rubber reclaiming industry since its start.

RUBBER

THE LOEWENTHAL CO.

JACK SIDER, *President* — **J. K. McELLIGOTT,** *Exec. Vice-Pres.*

We Solicit Your Inquiries

188 W. RANDOLPH STREET
CHICAGO 1, ILL.

Cable Address: "Gyblowell"

159 CLEWELL STREET
AKRON 5, OHIO

FOR UNIFORMITY AND PURITY

IN CHEMICALS FOR THE NEW RUBBERS

SELECT THESE GENERAL CHEMICAL PRODUCTS FOR YOUR REQUIREMENTS:

BASIC CHEMICALS

GENERAL CHEMICAL COMPANY

FOR AMERICAN INDUSTRY

Sulfuric Acid: All grades and strengths.

Aluminum Sulfate: To precipitate polymerized synthetic rubbers.

Fluosulfonic Acid: For production of Boron Trifluoride.

Potassium Cyanide—Sodium Cyanide: In production of acrylonitrile rubbers.

Sulfur: Commercial Rubbermakers' and other grades.

Copper Fluoborate—Zinc Fluoborate—Copper Cyanide—Sodium Cyanide: Intermediates for "plating" rubber to metals.

Lead Fluoborate: For lead plating in battery manufacture.

Baker & Adamson Reagents and Fine Chemicals

GENERAL CHEMICAL COMPANY

40 RECTOR STREET, NEW YORK 6, N. Y.

Sales and Technical Service Offices: Atlanta • Baltimore • Boston • Bridgeport (Conn.) Buffalo • Charlotte (N. C.) • Chicago • Cleveland • Denver • Detroit • Houston • Kansas City • Los Angeles • Minneapolis • New York • Philadelphia • Pittsburgh • Providence (R. I.) San Francisco • Seattle • St. Louis • Utica (N. Y.) • Wenatchee • Yakima (Wash.)

In Wisconsin: General Chemical Wisconsin Corporation, Milwaukee, Wis.

In Canada: The Nichols Chemical Company, Limited • Montreal • Toronto • Vancouver

THE RUBBER INDUSTRY NEEDS YOUR IDEAS...

For the processing or utilization of cured synthetic scrap rubber

$1000.00 IN CASH PRIZES for the best answer

It is admittedly a tough problem, but a group of men connected with the rubber industry in Chicago, known as the Chicago Rubber Group, believe that YOU can help us to find the solution. This group is offering a total of $1000.00 in three prizes for the best papers on the utilization (reclaiming and processing) of cured synthetic rubber scrap. While the papers may deal with any phase of the problem, here are some subjects that suggest themselves: 1. Separation and segregation of synthetic scrap rubber. 2. Methods of identification of synthetic scrap rubber. 3. Compounding studies which will result in greater use of reclaimed synthetic scrap, or of ground synthetic scrap rubber. First prize: $500.00; second prize: $300.00; third prize: $200.00. Be sure to enter this contest. You may win a prize.

READ THESE SIMPLE CONTEST RULES

This contest is open to anyone in the United States or Canada excepting officers and directors of the Chicago Rubber Group for 1943-45. Selection of subject matter is left to the discretion of the contestant. As many papers as desired may be submitted by any one contestant. Papers should be based upon information which has not previously been presented before any technical society meeting or published in any trade magazine. Contest closes at midnight on August 1, 1945. Awards will be made during the fall meeting of the American Chemical Society in Chicago, 1945. The decision of the judges will be final. Each author must submit three copies of his paper to Mr. A. R. Floreen, Vice-President, City National Bank & Trust Company, 208 S. La Salle Street, Chicago. These three copies will be judged separately by the Rubber Manufacturers Association, the Rubber Reclaimers Association and the Rubber Division of the American Chemical Society. The judges will report their findings to Bruce W. Hubbard, Chairman, Chicago Rubber Group, 2512 W. 24th Street, Chicago, to whom all inquiries for additional information should be addressed.

Sponsored by CHICAGO RUBBER GROUP, Chicago

SPACE DONATED BY WITCO CHEMICAL COMPANY

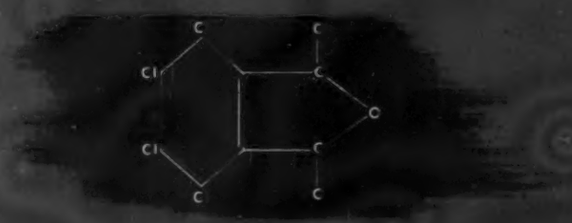
PRESENTING...

Niathal

TETRACHLORO PHTHALIC ANHYDRIDE

A NEW AND VERSATILE INDUSTRIAL CHEMICAL For Which A Manufacturing Process Has Been Developed

● NIATHAL* is fully chlorinated Phthalic Anhydride—all four hydrogen atoms being replaced by chlorine. The molecular structure of Tetrachloro Phthalic Anhydride may be represented as follows: The molecular weight of this compound is 285.9 and the chlorine content is 49.6%. It is made by a novel process for which patent protection is pending.



PROPERTIES—NIATHAL is an almost white, odorless powder. Its purity is greater than 99%, the remainder being chiefly chemically bound water. It is free-flowing and non-hygroscopic.

NIATHAL melts with very slight decomposition at 254-255°C (255°C = 491°F), as against 254.9°C for the 100% pure compound. It has an appreciable vapor pressure at elevated temperatures and particularly above its melting point. It boils at approximately 362°C (684°F).

Although our own experience indicates that NIATHAL is non-irritating and non-toxic, we recommend suitable precautions when using it for making new compounds and products.

SOLUBILITY—100 parts of water dissolves with difficulty up to 0.33 parts of NIATHAL at 20°C and about 1.6 parts at 90°C, forming the corresponding dibasic acid. A pH of about 2.0 characterizes this solution.

With caustic soda or caustic potash solutions NIATHAL readily forms the neutral alkali salts, both of which are highly soluble; about 35% aqueous solutions of these salts may be obtained at 65°C. These salts, as well as the slightly soluble acid salts, form crystalline solids. NIATHAL forms nearly insoluble salts of several common metals.

NIATHAL is soluble in several organic solvents. For example, 2 to 6% solutions may be obtained at room temperature in Acetone, Benzene, and Chlorobenzene. Solubilities materially increase with elevation of temperature.

USES—Since Phthalic Anhydride has found extensive use in numerous synthetic organic chemical industries, it is predicted that the chlorinated product will also find large and varied outlets. The introduction of almost 50% chlorine into the molecule yields new and interesting properties. The chemical structure is highly stable. This fact, in combination with high melting point, suggests that compounds made from NIATHAL may be used at more elevated temperatures. High chlorine content also improves resistance to fire.

NIATHAL is suggested for use as an intermediate or compounding material in the manufacture of...

DYES • ESTERS • SYNTHETIC RUBBERS • PHARMACEUTICALS • PLASTICIZERS • INSULATING MATERIALS • FUNGICIDES • PROTECTIVE COATINGS • LUBRICANTS • SYNTHETIC RESINS.

SHIPPING CONTAINERS—NIATHAL will be shipped in fiber containers or paper-lined wooden barrels of various sizes. It is at present available only in experimental amounts. Sample on request.

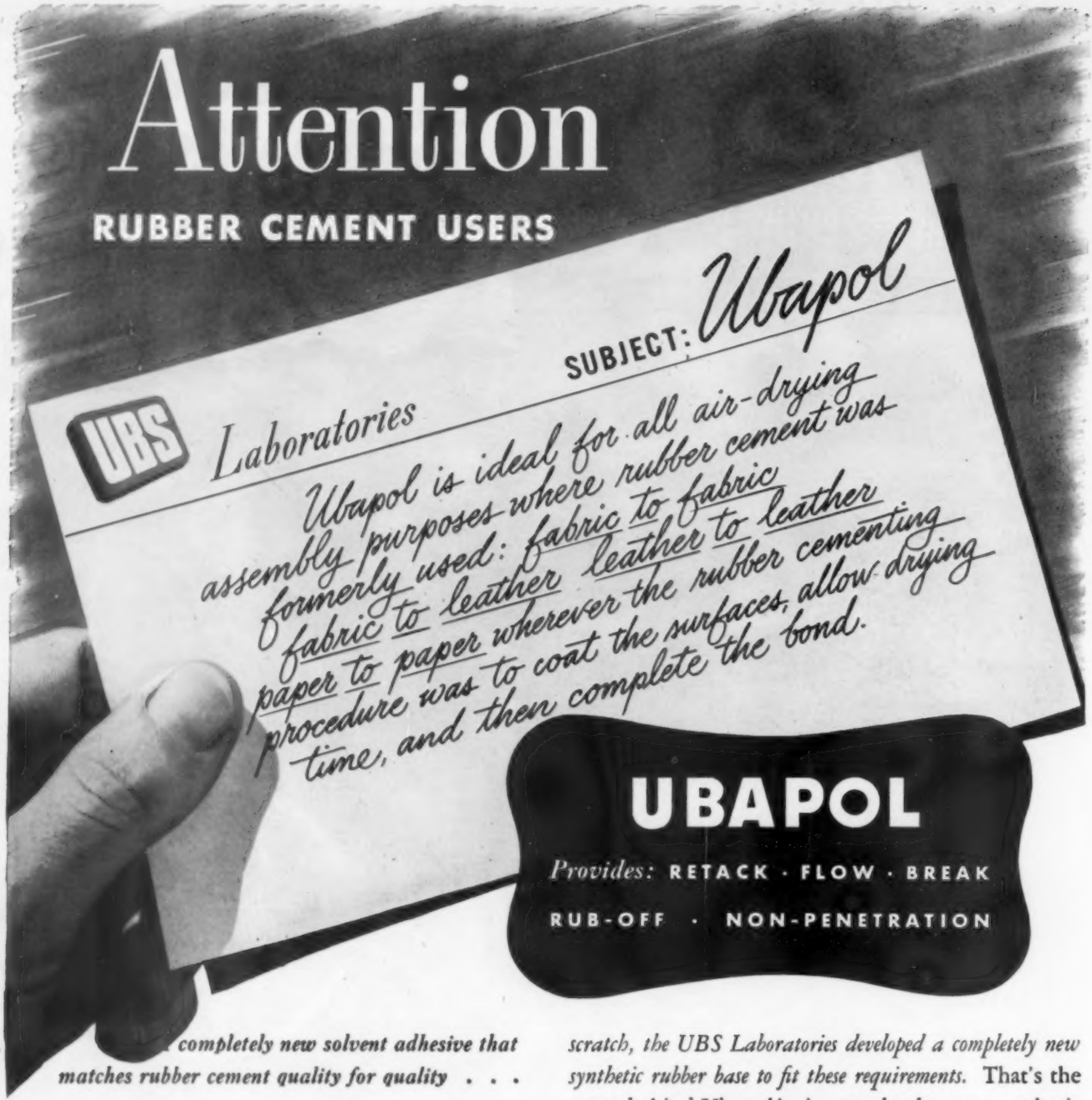
Niagara ALKALI COMPANY

"An Essential Part Of America's Great Chemical Enterprise"

60 EAST 42nd STREET, NEW YORK 17, N. Y.

CAUSTIC POTASH • CAUSTIC SODA • PARADICHLOROBENZENE • CARBONATE OF POTASH • LIQUID CHLORINE

*Trade Mark Registration applied for


Attention
RUBBER CEMENT USERS
SUBJECT: Ubapol
UBS
Laboratories
Ubapol is ideal for all air-drying assembly purposes where rubber cement was formerly used: fabric to fabric paper to paper leather to leather procedure was to coat the surfaces, allow drying time, and then complete the bond.
UBAPOL
Provides: RETACK · FLOW · BREAK
RUB-OFF · NON-PENETRATION

completely new solvent adhesive that matches rubber cement quality for quality . . .

First, UBS Technicians wrote down the characteristics needed in a synthetic rubber base to provide an adhesive with *all* the qualities industry used to look for in an air-drying rubber cement. *Then, starting from scratch, the UBS Laboratories developed a completely new synthetic rubber base to fit these requirements.* That's the story behind Ubapol! A completely new synthetic rubber solvent adhesive compounded to match rubber cement quality for quality. Ideal for all air-drying assembly purposes where rubber cement was formerly used.

Samples gladly sent upon request.

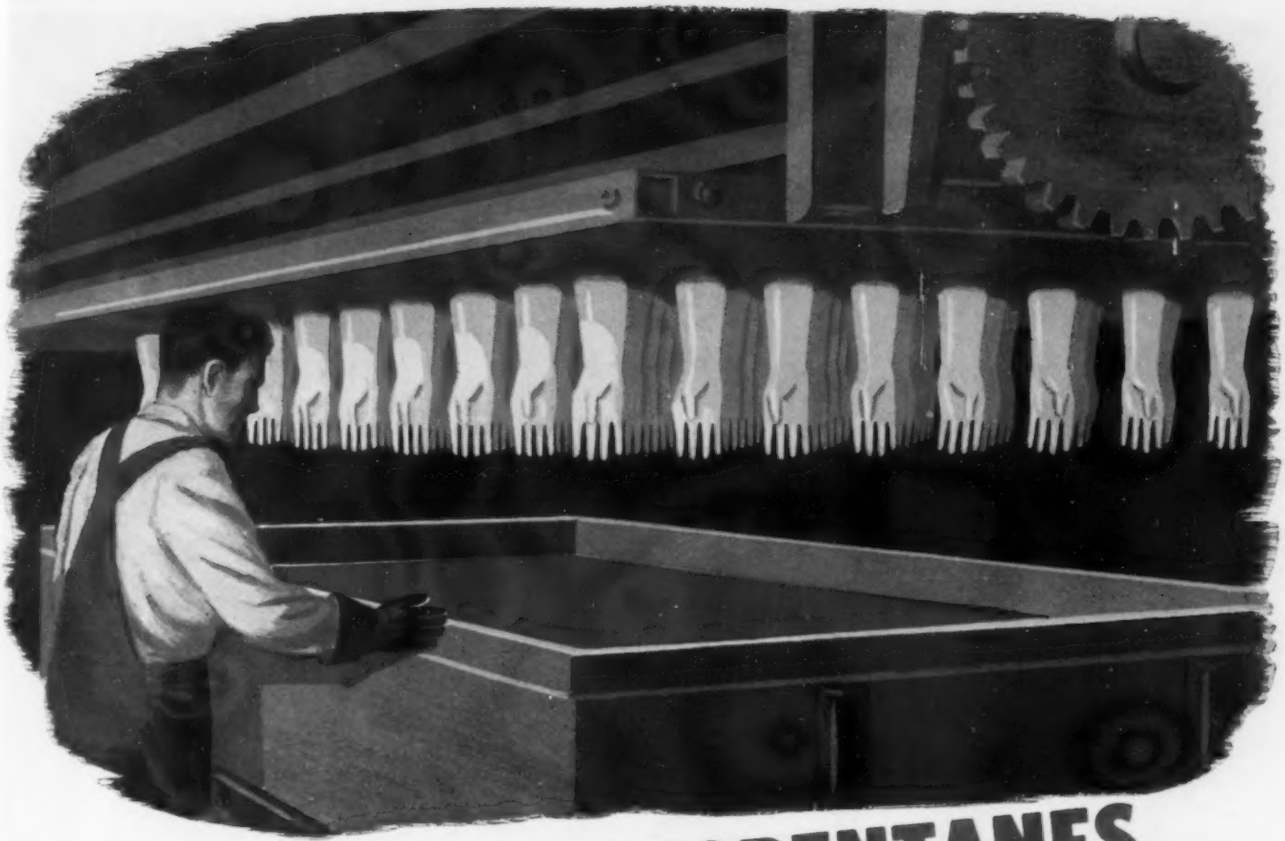
Address all inquiries to the Union Bay State Chemical Company, Rubber Chemicals Division, 50 Harvard Street, Cambridge 42, Massachusetts.

UBS

UNION BAY STATE
Chemical Company

Serving Industry with Creative Chemistry

ORGANIC CHEMICALS · SYNTHETIC LATEX · SYNTHETIC RUBBER
PLASTICS · INDUSTRIAL ADHESIVES · DISPERSIONS
COATING COMPOUNDS · IMPREGNATING MATERIALS · COMBINING CEMENTS



SHARPLES CHLOROPENTANES

SYNTHETIC RUBBER CEMENT SOLVENTS

DICHLORO PENTANES

Specifications

Color	Clear and light yellow
Sp.Gr. @ 20/20°C.	1.07-1.08
Acidity as HCl	Not over 0.025%
Water Content	None
Distillation, 95% between	130-200°C.

MIXED AMYL CHLORIDES

Specifications

Color	Straw to deep purple
Sp.Gr. @ 20/20°C.	0.88
Acidity as HCl	Not over 0.03%
Amylene and Pentane Content	Less than 3.0%
Distillation, 95% between	85-109°C.

Sharples Dichloro Pentanes No. 14 is finding wide application as a primary solvent for the formulation of dipping cements based on the oil resistant synthetic rubbers of the Buna N type. Through its use, stable high viscosity cements yielding heavy deposits upon dipping may be realized. While a less effective solvent for this type of synthetic rubber, Mixed Amyl Chlorides tend to lower the viscosity of cements based on these rubbers and, accordingly, may be used to advantage as a co-solvent along with Dichloro Pentanes No. 14 or other solvents in adjusting the viscosity of the resulting cement. Buna N cements formulated with either Dichloro Pentanes No. 14 alone or with combinations of this solvent and Mixed Amyl Chlorides are resistant to gelling at room temperature over long periods of time. Vulcanized deposits, laid down from cements formulated with these solvents, are characterized by their superior stress-strain properties.

Both of these chlorinated hydrocarbons are large production, low cost items. Further particulars and samples will be submitted gladly upon receipt of your request.

SHARPLES TRADE MARK CHEMICALS

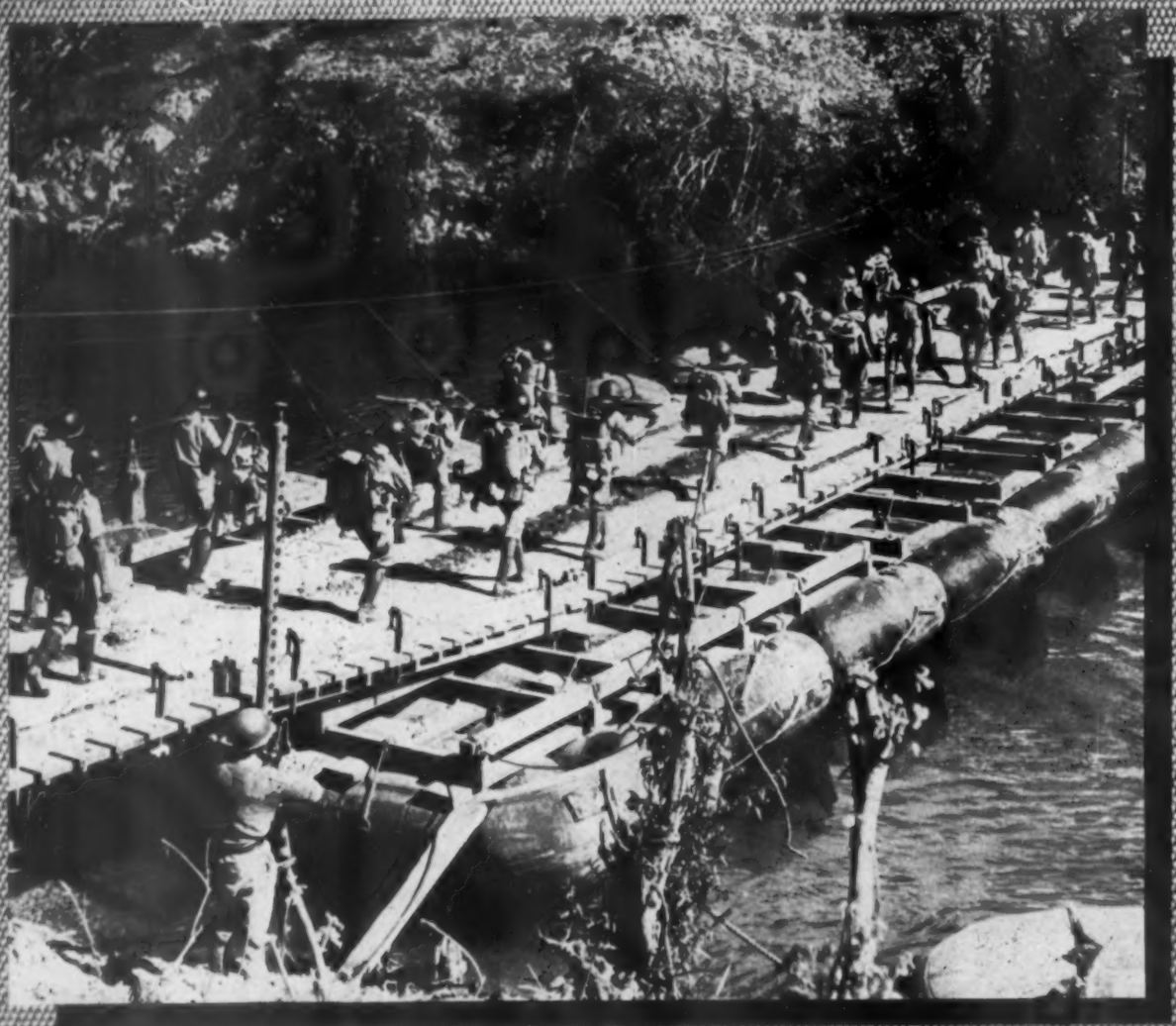
SHARPLES CHEMICALS INC.

PHILADELPHIA CHICAGO NEW YORK

ARMY E NAVY

MT. VERNON FABRICS

ASSOCIATED WITH UNIFORM QUALITY FOR OVER HALF A CENTURY



Backbone for a Rubber Bridge

Official U. S. Army Photo

Putting backbone into rubber products calls for fabrics with a high degree of uniformity. That's where the careful production of Mt. Vernon fabrics comes in to bridge the gap between good rubber products and better rubber products. Close laboratory control guides every step in the production of Mt. Vernon fabrics toward higher uniformity . . . selecting only top grades of cotton for greater strength and durability. When specifications call for more uniform fabrics, you will find them in Mt. Vernon brands.

MT. VERNON WOODBERRY MILLS, INC.

TURNER HALSEY COMPANY

Selling Agents

40 WORTH STREET ★ NEW YORK, N. Y.

CHICAGO · NEW ORLEANS · ATLANTA · BALTIMORE · BOSTON · LOS ANGELES · SAN FRANCISCO

a new AGING BATH BY "Precision"

Oil immersion—for aging Rubber & Elastomers in oils or liquids in test tubes . . .

DESCRIPTION

This Aging Bath has a capacity of 24 test tubes, 38 mm dia. x 200 or 300 mm long. The test tubes are supported in an adjustable rack which can be readily removed when desired. Rack is made of stainless steel and rests directly in the bath. The top shelf of the rack guides the condenser in a vertical position.

The bath is heated by steel-sheathed immersion heaters controlled by an adjustable, hydraulic thermostat which provide uniform and constant temperature. Circulation is provided by a ball-bearing, fully enclosed resilient-mounted motor stirrer.

Temperature range of bath is 35 to 200° C., with an accuracy of plus or minus 1° C.

Interior of bath made of stainless steel, exterior of galvannealed iron finished in high temperature aluminum. 3" of glass wool insulation is provided on sides and bottom.

Overall dimensions, including rack: 49" high, 24" wide, 24" deep. Oil capacity — 19 gallons. Support stand, with upper and lower shelf, for bath can be furnished. It is 24" high.

Electrical characteristics: 115 Volts, 60 Cycles, A.C., 3000 Watts.

Write for complete information.

ASTM D 471—Changes in Properties of Rubber and Rubber-like Materials and Liquids.

ASTM D 735—Rubber and Synthetic Rubber Compounds for Automotive and Aeronautical Applications.

This bath was developed for use in estimating the comparative ability of rubber and other elastomeric compositions to withstand the effect of immersion in oils and liquids and to secure comparative data on which to base judgment as to the service quality, and is especially useful in research and development work.

Can also be used for aging rubber or elastomers in air in test tubes.

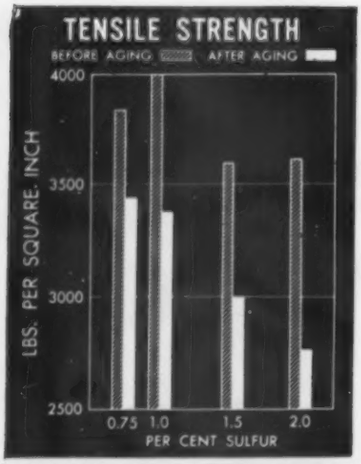
Eliminates the variable effect due to contamination of other samples, and variations in the circulation of the air in the conventional type of oven.

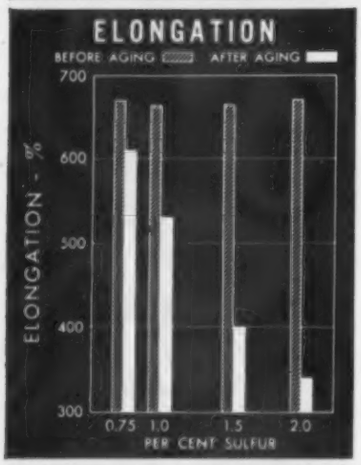
See "High Temperature Oven Aging of Oil-Resisting Synthetic Rubber Compounds", by G. D. McCarthy, A. E. Juve, H. Boxser, M. Sanger, S. R. Doner, E. N. Cunningham, J. F. McWhorter, and R. H. Crossley, Page 33, January, 1945, ASTM Bulletin No. 132.

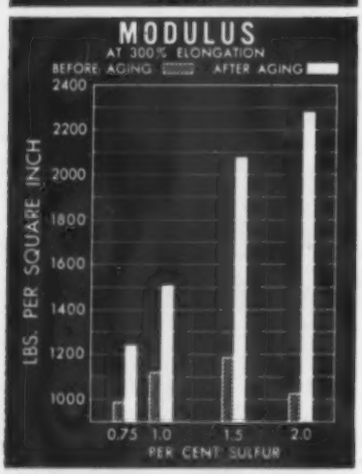
WRITE FOR RUBBER AND PLASTICS CATALOG No. 1000

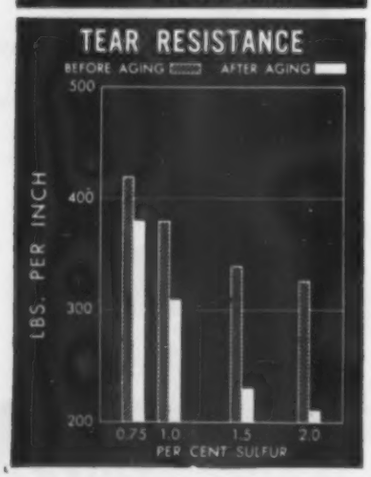
See Your Laboratory Supply Dealer

PRECISION SCIENTIFIC COMPANY
1736-54 N. Springfield Ave., Chicago 47, U.S.A.
Engineers and Builders of Scientific Research and Production Control Equipment









Give your GR-S Compounds heat stability provided by low sulfur content

Safe, fast curing now made possible by FBS LITHARGE

As you know, reduction in sulfur content means increase in heat stability.

It has now been demonstrated that FBS litharge (plus benzothiazyl disulfide) makes low sulfur formulas practicable.

Why?

Because it speeds up greatly the rate of cure without increasing the risk of scorching.

Thus, even though the normal quantity of accelerator is used, *the sulfur content can be reduced.*

Note, in the series of tests charted and tabulated, the superior behavior of the 0.75 and 1.0 sulfur formulas.

FORMULA

GR-S (Institute)	100
E.P.C. Carbon Black	50
Zinc Oxide	3
Coal tar softener	5
Benzothiazyl Disulfide	1.0
FBS Litharge	1.5
Sulfur	variable

Effect of Varying Amounts of Sulfur on Physical Properties

(Curing period: 20 min. Temp: 287° F.)

% Sulfur	*Tensile Strength*	*% Elongation*	*Modulus at 300% Elong.*	*Tear Resistance*
0.75	3840	670	980	420
1.0	4000	665	1120	380
1.5	3600	665	1190	340
2.0	3620	670	1025	325
After Aging 24 Hours at 100° C.				
0.75	3460	610	1240	380
1.0	3380	530	1510	310
1.5	3000	400	2080	230
2.0	2770	340	2280	210

CONCLUSIONS:

1. FBS Litharge-thiazole with low sulfur imparts heat stability.
2. Modulus is high and steady.
3. Elongation is retained despite exposure to heat.
4. Heat stability prevents brittleness and improves tear resistance.
5. Rate of cure is relatively fast, without tendency to scorch.
6. The combination is inexpensive and efficient.

Ask us to send you a printed report, "Compounding of GR-S for Heat Resistance," issued by the Rubber Division of our Research Laboratories, which covers the subject of FBS Litharge for low sulfur formulae in greater detail and from a number of additional angles.

NATIONAL LEAD COMPANY New York, Buffalo, Chicago, Cincinnati, Cleveland, St. Louis, San Francisco; Boston (National-Boston Lead Co.); Pittsburgh (National Lead & Oil Co. of Penna.); Philadelphia (John T. Lewis & Bros. Co.).

PERBUNAN...the Synthetic Rubber that stays on the job!...

Vacations are swell, yes, but rubber parts in mechanical applications have no time for a vacation . . . especially when their performance is essential to final victory!

Oil resistance combined with ruggedness makes Perbunan ideal for any number of adaptations. It will stand up under strenuous service without undue fatigue, and versatile Perbunan stays on the job under extremes of heat or cold.

When you need a special rubber to meet specific problems, look to Perbunan. You're almost certain to find the formula you need, already tested and proved, in the *Perbunan Compounding and Processing Manual.* Phone us or drop us a line if you haven't received a copy.

PERBUNAN
REG U S PAT OFF.

THE SYNTHETIC RUBBER THAT RESISTS OIL, COLD, HEAT AND TIME

Copyright 1945 by Stanco Distributors, Inc.

Write STANCO DISTRIBUTORS, INC., 26 Broadway, New York 4, N. Y., or First Central Tower, 106 So. Main St., Akron 8, Ohio, 75 East Wacker Drive, Chicago 1, Illinois, West Coast Representatives—H. M. Royal Co., 4814 Loma Vista Avenue, Los Angeles 11, California. Warehouse stocks in New Jersey, California and Louisiana.

What you should know about

VISTAC

TACKIFIERS

PLASTICIZERS

MODIFIERS

Improves the tack, adhesion, moisture-proof qualities of:

GR-S

ASPHALTS

WAXES

VISTANEX POLYBUTENE

RECLAIMED RUBBER

SPECIAL-PURPOSE, SYNTHETIC, RUBBER-LIKE MATERIALS

VISTAC — A group of viscous, tacky plasticizers for rubber, reclaimed rubber, various synthetics. Produces soft stringy tack characteristics in adhesives based on GR-S, Vistanex Polybutenes.

VISTAC #1 — A wholly synthetic hydrocarbon polymer, is a true liquid of extremely high viscosity, nearly water white in color, with extremely good compatibility characteristics in rubber and synthetic rubber. It is particularly valuable in combination with Vistanex Polybutene. Is also widely used in blends of GR-S and reclaim.

VISTAC A — A bright amber colored, extremely high viscosity liquid. It normally produces greater tackiness than does Vistac #1. Vistac A has the lowest viscosity index of the Vistac group of plasticizers. Vistac A is freely available without allocation.

VISTAC P — An amber colored liquid of very high viscosity, a pure hydrocarbon. Vistac P is an outstanding tackifier for Vistanex base adhesive compounds and works well with blends of GR-S and reclaim. Vistac P has the highest viscosity index of the Vistac group of plasticizers. Vistac P is available freely without allocation.

All grades of Vistac may be used in dry mill or mixer compounding of Vistanex, GR-S and reclaim to produce desirable plasticity and tackiness with good aging characteristics. All may be emulsified into water to make a base to be blended with natural latex, reclaim dispersions, and GR-S latices.

ADVANCE SOLVENTS & CHEMICAL CORP.

245 Fifth Avenue — New York, N. Y.

"Riding Comfort"

FOR INDUSTRIAL MACHINES

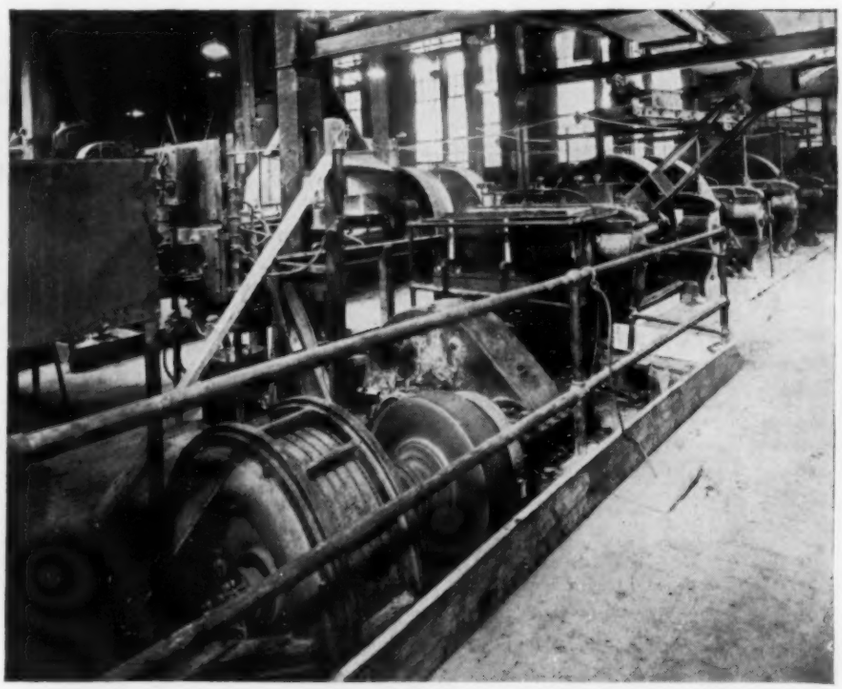
Smooth operation, and freedom from shocks and vibration, are just as important in your heavy-duty machines as they are in your motor vehicles.

Now, for the first time, you can give your machines true air-cushioned "riding comfort" with the Fawick Airflex Clutch.

This new clutch controls power and torque through a cushion of air and rubber. Regulated inflation gives you clutch engagement as light or as firm as the job demands. There are no springs, arms or toggles, no adjustments to make, no lubrication required. Misalignment is corrected automatically. Maintenance costs are usually low. Both drive and driven members have new nonmetallic safety and protection.

Our experienced engineering department will gladly give you recommendations for your machines.

THE FAWICK AIRFLEX CLUTCH provides air-cushion clutch action because it matches today's fine motor vehicle tires in quality of material and excellence of workmanship — the result of the great technical advances made by America's Rubber Industry.



The Fawick Airflex Combined Clutch and Brake for rubber mills exceeds all minimum safety requirements. Introduces new operating and maintenance economies.

FAWICK AIRFLEX COMPANY, INC. • **9919 Clinton Rd. Cleveland 11, Ohio**

In Canada, **Renold-Coventry Ltd., Montreal, Toronto, Vancouver** • *In Britain,* **Crofts Engineers, Ltd., Bradford, England**

FAWICK *Airflex* CLUTCH

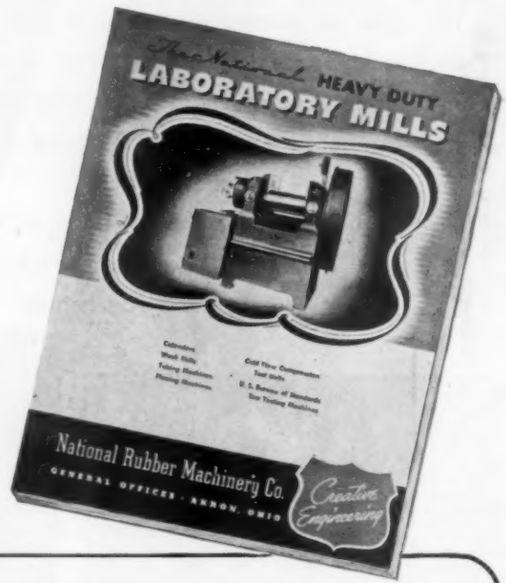
POWER CONTROLLED BY AIR

ACT NOW—TO GIVE YOUR RESEARCH THE ADVANTAGE OF RELIABLE, RUGGED, PRECISION LAB EQUIPMENT

PLANNING to expand your research activities? Then, select equipment that's engineered for *results*—now and for years to come!

National's new line of laboratory mills, calenders, washers, tubing machines, and allied equipment is designed to give the progressive research engineer the tools he needs to maintain and improve his company's position in a fast-moving field. Frills are absent. Features of marginal value have been omitted. The entire emphasis has been placed upon simplicity of design, safety of operation, efficient performance, and precise, yet rugged construction.

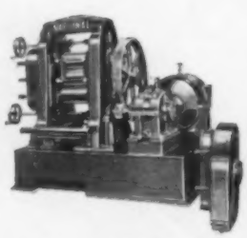
WRITE TODAY *for this fully informative catalog of Heavy Duty Laboratory Mills and allied equipment. Contains complete specification data on the most modern types of laboratory equipment. Write on your company letterhead asking for catalog Number RA7, and it will be sent you promptly.*



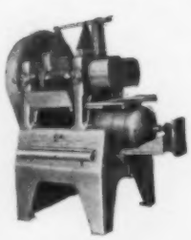
EVERY RUBBER RESEARCH MAN SHOULD KNOW THIS EQUIPMENT!

Full specification data on 7 different types of laboratory equipment are contained in the catalog shown above . . .

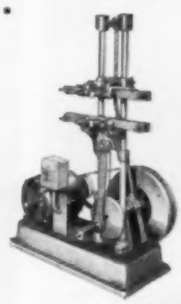
4" x 9" LABORATORY MILL
Special Model 42, approx. capacity: 600 gm. max.—90 gm. min. Available in larger models up to 3000 gm. max. —900 gm. min.

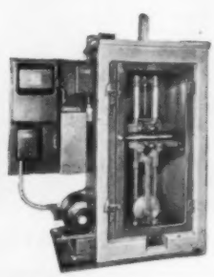


LABORATORY CALENDER
6" x 12" 3-Roll



LABORATORY WASHER
6" x 12" Model 40

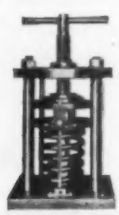




FLEXING MACHINE
Model D (De Mattia)

LABORATORY TUBING MACHINE
1" or 1¼"

U. S. BUREAU OF STANDARDS TIRE TESTING MACHINE



COLD FLOW COMPRESSION TEST UNIT

NATIONAL RUBBER MACHINERY CO.
General Offices: AKRON 11, OHIO

Creative Engineering

BAKER® PLASTICIZERS

FOR

VINYL RESINS
CELLULOSE RESINS
UREA-FORMALDEHYDE RESINS
MELAMINE RESINS
PHENOLIC RESINS
STYRENE RESINS

AND

BUNA-S
BUNA-N
NEOPRENE

For LOW TEMPERATURE *Flexibility*

THE
BAKER CASTOR OIL COMPANY
Established 1857
120 Broadway, New York 5, New York
Chicago, Ill.
Los Angeles, California

• BAKER PLASTICIZERS CONTAIN NO PHTHALATE

The Time Is Now!

To attain a wartime goal in the quality and quantity production of lead-free zinc oxides, the St. Joseph Lead Company at the outset of the conflict, found itself in a fortunate position. The flexibility of its patented electrothermic process made it possible to produce St. Joe Zinc Oxides to a wider range of highly exacting specifications than could ordinarily have been achieved. This may not be news to our good friends and customers of many years' standing. It will be of definite interest, however, to other consumers of lead-free zinc oxides whom we have not yet had the privilege of serving.

ST. JOSEPH LEAD COMPANY

250 PARK AVE., NEW YORK, 17, N. Y.

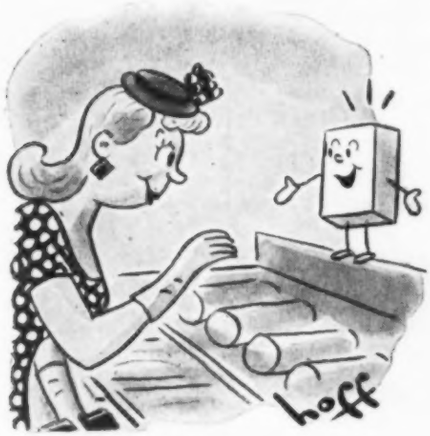
MADE BY THE LARGEST PRODUCER OF LEAD IN THE UNITED STATES

"SILENT SALESMEN?"

NOT THESE! COATED LITHWITE MAKES 'EM TALK!

"LOOK HERE, LADY!"

"HEY MISTER....LOOKY"



"SEE, LADY, I'M JUST WHAT YOU NEED"

"PST-T...LOOK HERE"

This revolutionary paperboard gives packages a crispness and freshness that makes them speak out on the shelf

As rising business costs swing more and more retailers over to the self-service idea, it isn't enough for packages to be "silent salesmen." Packages will have to *talk*. They'll have to out-talk their competitors. Talk their way off the shelf to the cash register.

And they can. *Coated* Lithwite folding cartons have already proved what they can do in mass displays. *Coated* Lithwite packages have a stand-out brightness and crispness because this revolutionary coated board takes ink better, reproduces colors more sharply and brilliantly. What's more, they have a quality look and feel that tips the scale in that split-second of indecision in a woman's mind.

Keep *Coated* Lithwite in mind, as you get into your postwar packaging plans. Clip the memo, keep it for the day when Gardner-Richardson can again accept new orders for folding cartons that "talk," made of this revolutionary paperboard.

The GARDNER-RICHARDSON Co.

Manufacturers of Folding Cartons and Boxboard

MIDDLETOWN, OHIO

CLIP THIS!

File this Coated Lithwite memo for reference when this quality paperboard is again available.

1. Made by a revolutionary process. Coated Lithwite is the brighter, whiter paperboard that is formed, made and coated in one high-speed operation. Proved and improved for six years.

2. Means more eye-appealing cartons. Coated Lithwite's smooth, velvety, chalk-free surface forms a better base for printing inks and plates—reproduces even the smallest type cleanly, crisply. Brings colors up brilliantly—gives halftones a sharp realism.

3. Fewer jammers and leakers. Coated Lithwite scores accurately without flaking or shattering. Takes a positive, tight seal.

Sales Representatives in Principal Cities: PHILADELPHIA • CLEVELAND • CHICAGO • ST. LOUIS • NEW YORK • BOSTON • PITTSBURGH • DETROIT

For Management Headquarters, too...

The Best Location in the Nation!

THE SUPERIOR ADVANTAGES of Cleveland and Northeast Ohio as a location for production and distribution are matched by this area's advantages as a location for management headquarters.

Many far-flung industries have their general offices here, and more managements are considering moving here postwar. You, too, should consider establishing your headquarters at this vantage point.

ONLY IN CLEVELAND and Northeast Ohio will industry find all of these outstanding assets . . . central location . . . superlative transportation . . . *adequate electric power at low rates* . . . manpower with the know-how . . . abundant basic materials, including fresh water . . . diversified industries to supply and to be supplied . . . desirable plants, warehouses and plant sites . . . favorable tax structure, with no state income tax.

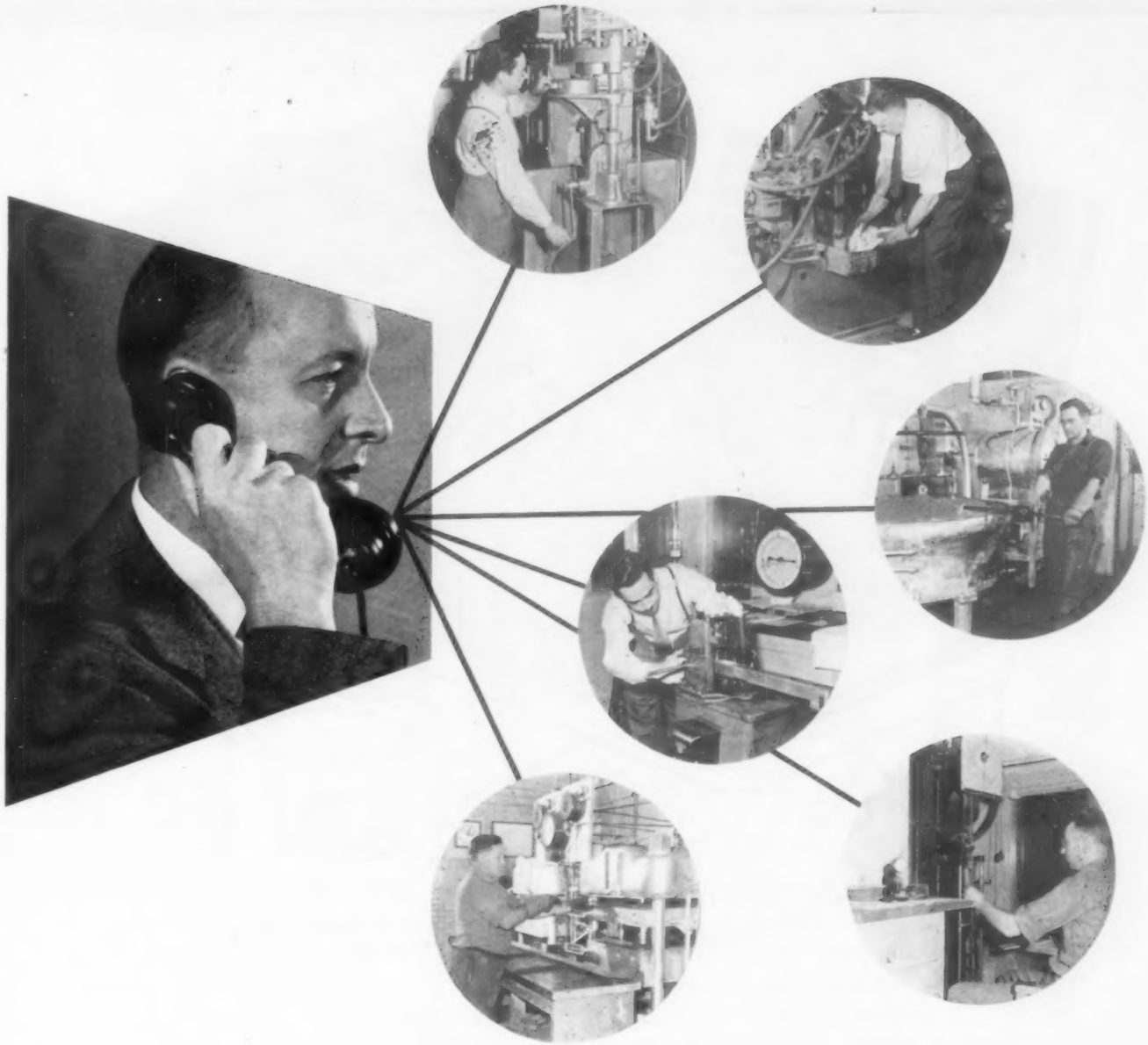
Here, too, are all essential business and industrial services . . . financial . . . advertising and public relations . . . legal and accounting . . . engineering and research . . . designing . . . and many more . . . as well as an excellent living and cultural environment.

TO INDUSTRIAL MANAGEMENTS we offer our confidential location engineering service without charge or obligation. Send for our new five-color brochure, "The Best Location in the Nation for Many Industries".

Call, write or wire Industrial Development Division, R. C. Hienton, Director

THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

79 PUBLIC SQUARE • CHERRY 4200 • CLEVELAND 1, OHIO



a call that gets action

ON RUBBER-COMPOUNDING PROBLEMS

When you present a compounding problem, on either synthetic or natural rubber, it is the signal for plenty of action in Monsanto Rubber Service Laboratories. One experiment . . . or a dozen . . . or a hundred . . . may be needed to give you a practical answer. But you *will* get a practical answer.

Monsanto Rubber Service Laboratories have been busy in Akron, Ohio, for more than a quarter of a century. They have grown up with the rubber industry.

The staff has been of great service to rubber manufacturers over the years because it is composed of men who know the science of chemistry as applied to rubber. And they know the practical side through experience gained in rubber plants.

The practical, dependable services of Monsanto Laboratories are yours without cost or obligation. For further information, please write MONSANTO CHEMICAL COMPANY, Rubber Service Department, Second National Bldg., Akron 8, Ohio.

MONSANTO CHEMICALS
Serving the Rubber Industry

Accelerators
Antioxidants
Colors
Plasticizers
Insoluble Sulfur "60"
Wetting Agents

MONSANTO CHEMICALS
SERVING INDUSTRY . . . WHICH SERVES MANKIND

Prices based on first 66 months of both wars
Source: Bureau of Labor Statistics

Rationing, price and wage controls have held prices down . . . *but the next step is up to you!*

The silliest man (or woman) in America today is the one who thinks he's ahead of the game when he finds a way around the rules of rationing.

Why is he silly?

Because every time you pay more than ceiling prices, every time you buy rationed goods without stamps, you are breaking down the very controls that have kept your cost of living lower in this war than in World War I.

What else can you do to keep prices down? Tuck away every dollar you can get your hands on. Put it safely away into War Bonds, life insurance, banks.

Why? With more money in people's pockets than goods to spend it on—every unnecessary thing you buy tends to push prices up.

Save. Don't spend. It's common sense for today—safety for tomorrow.

ONE PERSON CAN START IT!

You give inflation a boost . . .

—when you buy anything you can do without

—when you buy above ceiling or without giving up stamps (Black Market)

—when you ask more money for your services or the goods you sell.

SAVE YOUR MONEY. Buy and hold all the War Bonds you can afford—to pay for the war and protect your own future. Keep up your insurance.

HELP US KEEP PRICES DOWN

A United States War message prepared by the War Advertising Council; approved by the Office of War Information; and contributed by this magazine in cooperation with the Magazine Publishers of America.

To Help You With Your Post-War Planning

THE LABORATORY GROUP—fresh from the press—will tell you why the Royle No. ½ and the Royle No. 1 are the extruding machines you will want to know more about when you formulate plans for post-war production and put those plans into operation. In an entirely evolutionary manner features have been built into these extruding machines which will secure successful results with the ever lengthening list of extrudable compounds.

Whether your plans involve research or light product extruding THE LABORATORY GROUP bulletin gives you the basic data you will require . . . If you plan a program of research you will find that these extruding machines have the characteristics for heavier product extruding . . . If you plan light product extruding you will find it more profitable to use an extruding machine specifically designed for such a process.

Send for your copy of THE LABORATORY GROUP and let it suggest to you how these machines—the Royle No. ½ and the Royle No. 1—can meet your specific requirements.

JOHN ROYLE & SONS

ROYLE PATERSON N. J. 1880

PIONEERED THE CONTINUOUS EXTRUSION PROCESS IN

James Day (Machinery) Ltd.
London, England
REgent 2430

Home Office
B. H. Davis J. W. VanRiper
SHerwood 2-8262

Akron, Ohio
J. C. Clinefelter
UNiversity 3726

PATERSON 3, NEW JERSEY

An *Improved* Type of Rubber Clay

HYDRATEX-R

Water Refined - LOW Grit

HYDRATEX-R has these advantages for compounding light colored articles from GR-S:

1. Smooth, fast tubing
2. Excellent white color
3. Good reenforcement
4. Low cost

These properties are obtained at loadings of approximately 150 parts on 100 of GR-S.

HYDRATEX-R is also useful in other types of synthetics such as GR-I, GR-M and polyvinyl chloride.

Samples and further information available upon request.

HUBER

J. M. HUBER, Inc.
460 West 34th Street
NEW YORK 1, N. Y.

The RUBBER AGE

One of the World's Outstanding Rubber Journals

M. E. LERNER
Editor
LOIS HOPKINS
Production Manager
HARRIET K. COLE
Circulation Manager
PETER P. PINTO
General Manager

VOLUME 57
NUMBER 4

CONTENTS FOR JULY, 1945

Procedure for Determining Physical Properties of Films from GR-S Latices—*By C. R. Peaker* 423

Goodrich Inspectors Use Plant Intercom to Check Flaws ... 424

The Uniformity of GR-S from Fifteen Copolymer Plants—*By Ross E. Morris and Arthur E. Barrett* 425

A New Method for Determining the Freeze Resistance of Vulcanizates—*By Josph A. Talalay* 433

Testing Individual Rubber Life Saving Suits 436

Synthetic Rubber and Its Use in the Airplane—*By Jane B. Hutson* 437

Reports on a Few Recent Accidents in Rubber Factories ... 441

Abstracts of United States Patents on the Compounding and Use of Synthetic Rubber—*By Frederick Marchionna* ... 443

Status of Latex Foam Products for Civilian Markets 447

REGULAR DEPARTMENTS

New Equipment Section	472	Coming Events	456
Book Reviews	476	Obituaries	470
Editorial	448	Los Angeles News	466
Financial News	—	Rubber, Cotton Markets ...	486
Names in the News	462	Chemical Markets	488
Canadian News	468	Classified Ads	490

Also Publishers of:

RUBBER RED BOOK
Directory of to Rubber Industry
Published Biennially

ANNUAL BIBLIOGRAPHIES OF RUBBER LITERATURE
Compiled by D. E. Cable, Ph.D.
For Years 1935-1939

LATEX IN INDUSTRY (Out of Print)
By Royce J. Noble, Ph.D.
Text Book on Latex

LATEX AND ITS INDUSTRIAL APPLICATIONS (Vol. I)
By Frederick Marchionna
Bibliography of latex patents and literature to June, 1932.

LATEX AND RUBBER DERIVATIVES AND THEIR INDUSTRIAL APPLICATIONS (Vols. II & III)
By Frederick Marchionna
Bibliography of latex patents and literature from June, 1932 to January, 1937; rubber derivatives to January, 1937.

Published on the 15th of each month by

PALMERTON PUBLISHING COMPANY, INC.

Printing office,
East Stroudsburg, Pa.

Editorial and Advertising Offices,
250 West 57th St., New York 19, N. Y.

New England Representative—F. ROYAL CAREY, P.O. Box 133, Providence, R. I.
Western Representative—IRVING V. KOCH, 64 East Lake St., Chicago, Ill.

Entered as Second Class Matter, October 20, 1933 at the Post Office at East Stroudsburg, Pa., under Act of March 3, 1879. Subscription Rates: Domestic, $3.00 a year; Canada, $3.50; Foreign, $4.00. Single copies up to 3 months old, 35 cents; over 3 months old, 50 cents. Telephone COlumbus 5-2923, 5-2924.

Contents Copyrighted 1945 by the Palmerton Publishing Company, Inc.

Indexed in Industrial Arts Index. OFFICERS: P. L. Palmerton, President; E. D. Osborn, Vice-President and Secretary; Peter P. Pinto, Treasurer.

NAUGATUCK ACCELERATION FOR GR-S

BJF

COMBINES THE PROPERTIES OF THIAZOLE AND ALDEHYDEAMINE IN GR-S COMPOUNDS

FLAT CURING RANGE • LOW PERSISTENCY
ACTIVATED BY GUANIDINES AND THIURAMS
SAFE PROCESSING • ECONOMICAL

Recommended for

TIRE TREADS AND CARCASSES
CAMELBACK AND TIRE REPAIR STOCKS
CONVEYOR AND POWER BELTING
MOLDED PRODUCTS — SOLES AND HEELS

Write for Bulletin on BJF in GR-S Compounds

Process—Accelerate—Protect
WITH NAUGATUCK CHEMICALS

Naugatuck Chemical
DIVISION OF UNITED STATES RUBBER COMPANY
ROCKEFELLER CENTER NEW YORK 20, N. Y.
IN CANADA: *Naugatuck Chemicals Division, Dominion Rubber Co., Elmira, Ont.*

RUBBER AGE

VOL. 57, No. 3 JULY, 1945

Procedure for Determining Physical Properties of Films from GR-S Latices

By C. R. PEAKER

Research Chemist, Naugatuck Chemical Division of U. S. Rubber Co., Naugatuck, Connecticut

THIS article covers a new procedure for determining the physical properties of films from GR-S type synthetic rubber latices. In order to obtain satisfactory films for testing the latex solids should be above 30%. A suitable formulation which will reach the optimum cure in from 30 to 60 minutes at 100° C. is as follows:

Polymer	100.0
Sulfur	2.0
Zinc Oxide	3.0
Zinc mercaptobenzothiazole	1.5
Zinc dibutyldithiocarbamate	0.5

If zinc mercaptobenzothiazole is to be omitted, it is desirable to increase the amount of dithiocarbamate to about 1.0 part. If the dithiocarbamate is not used, vulcanization should be carried out at higher temperatures, such as 120° C. These vulcanizing ingredients may be used as a composite dispersion by ball milling the accelerator, sulfur and zinc oxide with 0.5 parts dispersing agent, such as Daxad 11, Vultramine, etc., to give a 45 to 50% dispersion.

It is recommended that freshly prepared pastes be used since experience has shown erratic results may occur when old pastes are used, particularly those containing zinc oxide. Additional stabilizers, such as soap, may be used with this compound if required in some cases. Films should be prepared promptly after the compound is made, as prevulcanization may occur in the final films and produce erratic results.

Preparation of Films

Dispersions of the vulcanizing ingredients or mixture should be stirred into the latex carefully to avoid incorporating air. Air in the compound may show up in the film as bubbles and cause erratic results. It is therefore advisable to let the compound stand for some time (1 to 2 hours) after mixing to allow the air to escape. It is frequently common practice to subject the

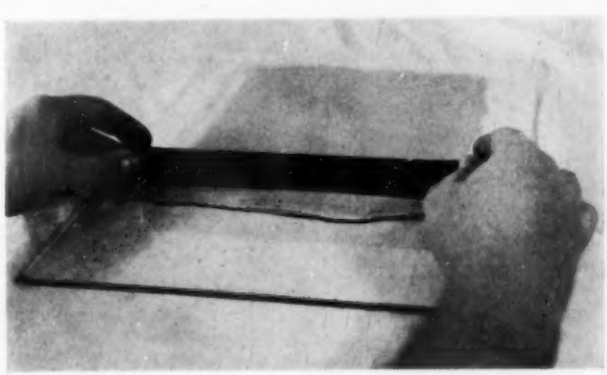


FIG. 1—Spreading films on smooth, clean glass plates. Note that the spreader bar is cut along one edge to give a uniform depression of .04 to .05 inches in depth.

compound to a mild vacuum (20 to 25") to hasten the removal of air, prior to depositing the films.

Since most latices are evaluated at relatively low solids, cracking of films frequently occurs on drying, due to marked shrinkage. To avoid this it is desirable to increase the viscosity of the mix considerably, as by adding such thickeners as ammonium alginate, in amounts from 0.25 to 0.5 parts per 100 parts polymer, alkaline casein solutions, etc. The optimum amount depends on the choice of thickener and the solids of the latex being used. The viscosity usually desired is approximately 75 to 100 cps.

Films are spread on smooth clean glass plates (Fig. 1), held in the horizontal plane and about 10 x 12 inches in size, by means of a spreader bar. This latter device is simply a straight bar of metal which has been cut along one edge to give a uniform depression of about .04 to .05 inches in depth. When latex is spread with such a bar, the wet film thickness is about .02 inches thick, providing the compound is at 40.0% solids concentration.

Films are usually dried in air overnight at room temperature, although accelerated drying at elevated temperature may be used. The maximum temperature to avoid precure should not exceed 50° C. After drying, the upper surface is dusted with a fine powder, such as soapstone, mica, whiting, etc., and the film is stripped from the plate (Fig. 2), following which the reverse side of the film is similarly dusted. The film is then divided into four pieces of equal size for testing.

Vulcanization

Vulcanization is conveniently carried out by suspending films in an air oven, with efficient circulation of the air. The formula given above will give optimum cures in 30 to 60 min. at 100° C. A range of cures is usually run, such as 15-30-60-120 min. at 100° C., to include both an undercure and an overcure in the series.

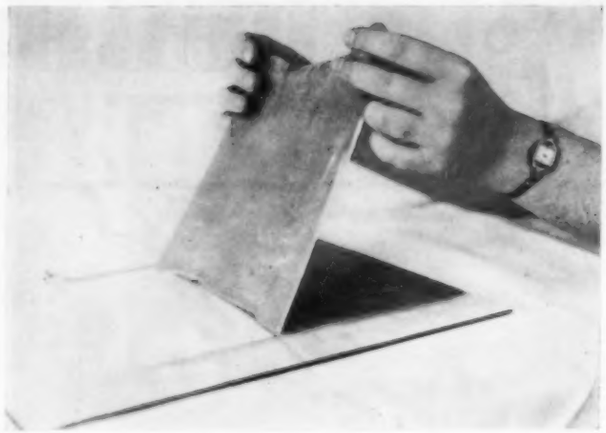


FIG 2—Stripping the film from the plate. After stripping the film is divided into four pieces of equal size for testing purposes.

Film Testing

Tensile, modulus or stress at 300% or other elongation and elongation at break are determined with a Scott machine provided with a special head (such as Model No. L-3 SP), recording forces up to 10 pounds and separating at a rate of 20"/minute. Permanent tension set at the break point is measured by determining the increase in length of the broken specimen (between bench marks) one minute after break.

The test piece is cut from the stock with a standard ⅛" x ½" dumb-bell die. Usually two to six tests are made for each cure. The A.S.T.M. Standard Section, 1942 Edition, Part III, D-412-41, describes formulae and calculations for such rubber film testing.

In comparing different latices, it is often desirable to average all the results for the range of cures and to consider these averaged values as characteristic of the latex, rather than to give only the data for the optimum cure.

Goodrich Inspectors Use Plant Intercom to Check Flaws

THE microphone has joined the micrometer and other tools that make up the equipment of the modern industrial inspector. To speed up war production, in certain departments of the B. F. Goodrich plant in Akron, Ohio, inspectors literally talk across the products they are inspecting into a special public address system, their "verdicts" going straight to the man doing the work.

Seated before a microphone, the inspector need only reach up and pull a callboard lever to "get the ear" of the responsible worker by way of a speaker horn suspended above the latter's place of work. Thus a deficiency occurring in one "heat" or molding operation, for example, can be spotted before the error is repeated. The workman can press a button and "talk back" through the speaker, which will pick up speech as far as 50 feet away.

The "mike" and speakers are credited not only with saving money and valuable wartime rubber, but also with speeding up production of carburetor diaphragms used in Flying Fortresses, B-19s, B-24s, and B-29s, as well as other diaphragms, brake cups, hydraulic brake rings and sealing rings, fuel cells and parts, and other items.

In Mill 4, home of the Miller Rubber division, the loud-speaker system has been in operation for a year and a half. A 21-station system reaches departments on five different floors and, when not being used for inspection reports, carries recorded music and news broadcasts to the workers. It has been so effective that a similar system with 20 stations has recently been installed in the industrial products division.

The idea of using loud speakers for this purpose originated with Frank E. Trockle, general superintendent of Mill 4. He borrowed a microphone and speaker and connected them up between the inspector and one diaphragm mold. The experiment was so successful that he called in the Electronic Engineering Company of Akron, which designed the two systems now in use.

The Uniformity of GR-S from Fifteen Copolymer Plants

By ROSS E. MORRIS and ARTHUR E. BARRETT

Rubber Laboratory, Navy Yard, Mare Island, California

THIS laboratory has made a spot check of the uniformity of the GR-S manufactured by fifteen copolymer plants. This work was done primarily to evaluate the tolerances to be allowed in specifications. Since the results of these tests may be of interest to rubber manufacturers, it was decided to publish the data, but in an abridged form because of their voluminosity.

Samples of twenty-two different lots of GR-S were tested. Nineteen of these lots were the regular general-purpose GR-S. Two lots were GR-S-St., which is regular GR-S containing a non-staining antioxidant (Stalite), and is made for use in the manufacture of light-colored or non-staining goods *(1)*. One lot was GR-S-85. This is a GR-S of high viscosity, approximately 85 Mooney. According to the WPB release *(1)*, this GR-S was developed for making cements for use in the manufacture of asbestos sheet packing where cements of controllable high viscosity are required. It is offered for general usage in cements. Because of its high Mooney viscosity, it is difficult to plasticize on the mill and is therefore not recommended for ordinary dry mixes. However, it was included in this investigation for comparison purposes. Table I is a list of the different lots of GR-S studied and the plants in which they were manufactured.

This investigation was divided into the following parts:

1. W.P.B. Specification
2. Low-Temperature Curing Stock
3. Soft Gasket
4. Cable Jacket
5. Wire Insulation

Note: The opinions or assertations contained herein are those of the authors and are not to be construed as official or reflecting the views of the Navy Department or the Naval Service at large.

TABLE I—LIST OF GR-S INVESTIGATED

Lot No.	Type	Agent of Rubber Reserve Company	Location of Plant	Wt. of Sample (lbs.)	Date Received
1	Regular	United States Rubber Co.	Torrance, California	25	4-14-44
1A	Regular	United States Rubber Co.	Torrance, California	10	4- 4-44
2	Regular	United States Rubber Co.	Naugatuck, Connecticut	25	5-14-44
3	GR-S-85	United States Rubber Co.	Naugatuck, Connecticut	25	5-14-44
4	Regular	United States Rubber Co.	Charleston, West Virginia	25	6- 6-44
5	Regular	Firestone Tire and Rubber Co.	Akron, Ohio	25	4-22-44
5A	Regular	Firestone Tire and Rubber Co.	Akron, Ohio	10	4-22-44
6	Regular	Firestone Tire and Rubber Co.	Port Neches, Texas	25	5-12-44
7	Regular	Firestone Tire and Rubber Co.	Lake Charles, Louisiana	25	6- 2-44
7A	Regular	Firestone Tire and Rubber Co.	Lake Charles, Louisiana	10	4- 5-44
8	Regular	Goodyear Tire and Rubber Co.	Akron, Ohio	*	8-13-44
8A	Regular	Goodyear Tire and Rubber Co.	Akron, Ohio	25	5-26-44
9	Regular	Goodyear Tire and Rubber Co.	Torrance, California	25	5-12-44
10	Regular	Goodyear Tire and Rubber Co.	Houston, Texas	25	5-18-44
11	Regular	B. F. Goodrich Co.	Port Neches, Texas	25	4-21-44
11A	Regular	B. F. Goodrich Co.	Port Neches, Texas	30	4-21-44
12	Regular	B. F. Goodrich Co.	Borger, Texas	25	5-10-44
13	Regular	B. F. Goodrich Co.	Louisville, Kentucky	25	5-25-44
14	Regular	General Tire and Rubber Co.	Baytown, Texas	25	4-26-44
15	Regular	Copolymer Corporation	Baton Rouge, Louisiana	25	5-30-44
16	ST	National Synthetic Rubber Co.	Louisville, Kentucky	25	4-20-44
16A	ST	National Synthetic Rubber Co.	Louisville, Kentucky	25	6-22-44

* This material was part of a 2990 pound shipment purchased for Yard use.

Each part will be considered separately, both as to testing procedures and results.

In making a comparison of this type it is necessary to consider the variation in test results due to uncontrollable factors, *i.e.*, experimental errors. For example, the authors have found that the mean deviation from the average of a series of tensile tests on a Hevea tread stock was about 3 per cent; the mean deviation from the average of a series of tear tests on the same stock was about 5 per cent.

In order to avoid as much as possible the masking of the variations between GR-S lots by the deviations of the test results for any given lot from their correct values due to experimental error, at least six repeat tests were conducted for tensile and tear properties, and sufficient tests were conducted for the other properties to obtain results which checked. The tensile strength, modulus, and ultimate elongation values were averaged by the referee method *(2)*. A modal average was taken of tear resistance values.

Because of the enormous amount of data obtained in this study, all of the test results will not be given. Instead, the results for each test will be summarized in a statistical manner, *i.e.*, as arithmetical mean, standard deviation,* and coefficient of variation. The GR-S lots which exceeded the standard deviation for each test will be listed. Presentation of the data in this manner should be convenient for assisting the determination of tolerances for specifications and the estimation of possible variations in factory batches.

W.P.B. Specification

Each GR-S lot was tested for conformity with the requirements of the War Production Board Specification effective January 1, 1944. The milling and testing procedures specified therein were followed. The specified recipe given below was used.

W.P.B. Test Recipe

GR-S	100.0
Wyex (EPC)	50.0
Zinc oxide	5.0
B.R.T. No. 7	5.0
Captax	1.5
Sulfur	2.0

In addition to the specified tests, the tear strength of the cured GR-S compounded as specified was determined on the 50-minute cure according to the A.S.T.M. procedure *(3)* using Die A. The tear strengths of both dry specimens and specimens wet with gasoline were determined. In the latter test, the nick in the specimen was kept wet with gasoline while the specimen was pulled apart in the testing machine. Previous work with this test has been published *(4)*.

The results of the W.P.B. specification tests were averaged, and the averages were found to comply with the respective specification requirements. Lot 3 also complied with the regular specification requirements except for crude and compounded Mooney viscosities. The crude viscosity of Lot 3 agreed closely with its special specification requirement of 85. The averaged results of the W.P.B. specification tests and of the special tear tests with the calculated statistical data are presented in Table II.

* Standard deviation is defined as the square root of the arithmetical mean of the squares of the individual deviations from the arithmetical mean. It is the preferred measure of dispersion. Coefficient of variation is the standard deviation expressed as a percentage of the arithmetical mean.

About a quarter of the individual GR-S lots were below the W.P.B. modulus limit for the 25-minute cure. However, only two lots were below the limit for the 50-minute cure and all lots were within the limits for the 90-minute cure. This shows that the lots which had low modulus for the earlier cures were slower curing than the others but were not structurally different. The only other respect in which several lots deviated from the W.P.B. specification was in the Mooney viscosity of the crude material.

No lots were outstanding for wet tear when compounded into the W.P.B. recipe, although several lots were above the standard deviation.

Lots 1A, 5, 7, 7A, and 8 were outside the standard deviation for at least seven tests. This means that these lots, while not being necessarily outside the W.P.B. tolerances, were somewhat irregular in comparison with the other lots.

A reasonable coefficient of variation for the W.P.B. tests is 10. Tests having higher coefficients of variation were the undercure tensile strength and undercure modulus tests, and the tests for volatile matter, fatty acid, soap and ash. The former tests reflect the variability in curing rate of the GR-S lots; the latter tests indicate the factors which are probably responsible for this variability in curing rate.

Low-Temperature Curing Stock

The behavior of the GR-S lots in a low-temperature curing stock was of interest to this laboratory because this type of stock is generally used for lining submarine battery compartments. These linings are usually temperature, it is necessary to use an extremely active vulcanization accelerator. In order that the stock may cured at 120° F. Because of this very low curing be mixed and calendered without scorching, it is necessary to introduce this accelerator or reactive accelerator component by diffusion after finishing the processing.

The recipe used in this study contained dibenzylamine and zinc oxide. Carbon disulfide was painted on the surfaces of the stocks after calendering. The active accelerator—probably the dibenzylamine complex of zinc dibenzyl dithiocarbamate—was formed by reaction of the carbon disulfide which diffused into the stocks with the dibenzylamine and zinc oxide already present. The recipe for the stock is given below:

Low Temperature Test Recipe

GR-S	100.0
Pelletex (SRF)	75.0
Zinc oxide	10.0
Bardol	15.0
D.B.A.	4.0
Sulfur	2.0

The batches were mixed on a cold 6x13-inch mill, the batch weight being 4 times the recipe weight in grams. The GR-S was plasticized according to the W.P.B. procedure *(5)*. This procedure gave sufficient plastication to all of the different lots of GR-S except Lot 3. This lot required about twice as much breakdown before it would form a band without holes. After adding the ingredients, the batches were given the regular A.S.T.M. mixing *(6)*.

Sixteen to 32 hours after mixing, the stock was calendered to a thickness of 1/16 inch and plied together to give a sheet 1/8-inch thick. Each side of the 1/8-inch sheet was painted with two applications

Table II—W.P.B. Specification Test Results

	Tensile Strength (psi)			Ultimate Elongation (%)			Modulus at 300% Elongation (psi)			Tear Resistance (Lbs. per 0.1 inch)		Volatile Matter (%)	Acetone Extract (%)	Fatty Acid (%)	Soap (%)	Ash (%)	Mooney Viscosity	
										Dry	Wet						Crude	Compounded
	25*	50	90	25	50	90	25	50	90	50	50							
W.P.B. Tolerances—Minimum	....	2500	....	....	500	....	400	800	1000	...	...	...	...	3.0	...	...	45	..
Maximum	....	....	....	....	....	....	900	1300	1600	...	...	0.75	10.0	6.0	0.75	1.50	55	80
Arithmetical Mean **	1840	2860	2840	770	630	520	440	930	1290	39.0	10.8	0.20	7.1	4.5	0.22	0.79	48	62
Standard Deviation	260	110	180	40	30	40	70	80	90	2.4	1.0	0.16	0.6	0.7	0.18	0.33	4	4
Coefficient of Variation	14	4	6	5	5	7	15	9	7	6	9	81	8	15	82	42	9	7
Lots outside W.P.B. Tolerances—Below	....	none	....	....	none	....	6,7,7A, 9,10,13	7,7A	none	...	...	...	...	7	...	...	9, 13	..
Above	....	....	....	....	....	....	none	none	none	...	...	none	none	none	none	none	5, 5A	none
Lots outside Standard Deviation—Below Mean	10,13, 15	6,7,11A, 12,15	1A,6,8, 12	15	1A	1A,8,12	6,7,13	7,7A	7,7A,9	7,8,11, 11A,16	11A,12, 16A	13	1A,2,5, 11,16A	4,5, 5A,7	5,5A, 7A,11A	2,5,5A, 7,7A	9,13	9,13
Above Mean	1A,5,8	1	14,16A	6,7, 7A,9	7,7A, 9,13	7,7A,9	1A,5,8	8,11A	none	8A	2,5,5A, 7,7A	7,11,14	7,8	1,11A	1A,4, 7,8A	6,16, 16A	5,5A	2,5,5A
Properties of Lot 3 (GR-S-85)	2580	2960	2870	760	530	440	570	1260	1570	34.5	9.8	0.04	6.0	4.9	0.20	0.57	87	92
Deviation of Lot 3 from Mean	+740	+100	+30	—10	—100	—80	+130	+330	+280	—4.5	—1.0	—0.16	—1.1	+0.4	—0.02	—0.22	+39	+30

* Minutes cure at 292° F. ** Lot 3 not included.

Table III—Low-Temperature Cure Test Results

	Tensile Strength (psi)					Ultimate Elongation (%)					Modulus at 100% Elongation (psi)					Shore Hardness After 30 Seconds				
	6*	12	24	36	48	6	12	24	36	48	6	12	24	36	48	6	12	24	36	48
Arithmetical Mean **	1100	1310	1420	1470	1420	430	350	300	270	250	210	350	470	570	570	47	54	61	62	65
Standard Deviation	270	80	90	80	130	50	50	30	20	30	70	60	60	40	30	8	4	2	2	1
Coefficient of Variation	25	6	6	6	9	11	14	9	9	12	33	18	13	7	5	16	7	4	4	2
Lots Outside Standard Deviation—Below Mean	13	1,8 12,13	8A,14	8	8	5	1,5, 8,16	1,5, 8,16	5,8,16	8,16	1,8,13	10,12,14	8A,12, 14	14	14	6,13	9,10, 13	8A, 11A,12	8A, 11A	13
Above Mean	2,9	2,16A	2,9	2,9	2,6,9	1,8,10	10,14	11	12,14	none	2,5,9	5,16	5,16	5,16	5,15	5	5,16	2,5	2,5,16	5
Properties of Lot 3 (GR-S-85)	1410	1800	1740	1960	1830	360	330	260	260	230	410	480	570	760	720	55	64	65	66	69
Deviation of Lot 3 from Mean	+310	+490	+320	+490	+410	—70	—20	—40	—10	—20	+200	+130	+100	+190	+150	+8	+10	+4	+4	+4

* Hours cure at 120° F. ** Lots 1A, 3, 5A and 7A not included.

Table IV—Soft Gasket Test Results

	Tensile Strength (psi)				Ultimate Elongation (%)				Modulus at 500% Elongation (psi)				Pusey and Jones Hardness†	Compression Set (%)	After Aging for 46 hrs. at 194° F.		Swell in Water (%)
															Tensile Strength (psi)	Ultimate Elong. (%)	
	15*	25	35	50	15	25	35	50	15	25	35	50	30	30	25	25	25
Arithmetical Mean **	950	1400	1390	1310	800	680	650	630	480	910	960	960	224	19.2	1580	580	1.3
Standard Deviation	160	90	100	150	60	40	40	50	120	90	90	80	8	1.8	160	50	0.6
Coefficient of Variation	17	6	7	11	8	6	6	8	24	10	9	9	4	9	10	8	49
Lots Outside Standard Deviation—Below Mean	1,9,10, 15,16	6,14, 15,16	6,14, 15	6,11, 16	12,16A	16,16A	16	6,11,16	9,10,15	8A,10, 13	8A,10, 13,15	8A,10, 13,15	5,12	5,11, 11A	1,8,13, 15	1,5,15, 16	1,5,7
Above Mean	11A,13	5,11A	1,5,16A	5,8A, 13,16A	8A,9, 10	8A,10, 13	8A,10, 13	8A,10, 13	6,11A, 16A	5,16, 16A	5,16, 16A	1,5, 16A	6,15	1,10, 13,15	7,12	8A	8A,10, 16A
Properties of Lot 3 (GR-S-85)	1400	1530	1550	1290	700	570	550	510	820	1250	1320	1270	169	14.9	1440	440	0.8
Deviation of Lot 3 from Mean	+450	+130	+160	—20	—100	—110	—100	—120	+340	+340	+360	+310	—55	—4.3	—140	—140	—0.5

* Minutes cure at 310° F. ** Lots 1A, 3, 5A, and 7A not included. † The lower the Pusey and Jones reading, the harder the stock.

of a 50-50 blend by volume of carbon disulfide and Union No. 8 solvent.* The sheet was then cut into tensile sheet size and stored at 82° F. for 24 hours.

At the end of the 24-hour storage time, the tensile sheets were placed in an oven at 120° F. One sheet was removed from the oven at the end of 6, 12, 24, 36 and 48 hours. Immediately after removal from the oven, the sheets were cooled by immersing them in water for 5 minutes. The sheets were dried and allowed to stand at 82° F. for one hour. Then tensile strength, ultimate elongation, and modulus at 100% elongation were determined according to A.S.T.M. procedures *(7)*. The Shore hardness after 30 seconds was taken on one thickness of each sheet. Lots 1A, 5A, and 7A were omitted from this part of the investigation because of insufficient quantities on hand.

Table III gives the test results obtained on the low temperature cures. The average time for optimum cure of the regular GR-S stocks, as judged by modulus, was 36 hours.† The Lot 3 stock reached optimum cure in the same time but had higher tensile, modulus, and hardness than the other stocks.

The variations between test results on the undercures of the regular GR-S stocks were quite large. On the other hand, the variations between test results on the other cures were surprisingly small in view of the possible non-uniformity in the application of carbon disulfide. This agreement between test results on the longer cures shows that the variations between test results on the undercured stocks must have been due largely to differences in rates of cure.

The results of the W.P.B. tests gave little indication of the behavior of the GR-S lots in the low temperature cures. Of the six lots which were below the W.P.B. tolerance for modulus of the 25 minute cure, only one, Lot 13, was below the standard deviation for modulus of the 6-hour cure in the present study. Correspondence between the lots outside the standard deviation in the present study and the lots outside the standard deviation in the W.P.B. testing program was also poor. It is concluded that the uniformity of GR-S to be used in low-temperature cure stocks cannot be foretold from the results of the W.P.B. tests.

Soft Gasket

The GR-S lots were compounded in the soft gasket recipe given below. Lots 1A, 5A, and 7A were omitted from this part of the investigation because of insufficient quantities on hand.

Soft Gasket Test Recipe

GR-S	100.0
Statex B(FF)	50.0
Zinc oxide	5.0
Heliozone	3.0
Dibutyl phthalate	8.0
Dibenzyl sebacate	8.0
Tributoxy ethyl phosphate	8.0
Thionex	2.0
Sulfur	0.4

The batches were mixed on a cold 10x20-inch mill, the batch weight being 14 times the recipe weight in grams. The GR-S was broken down using the gauge and number of cuts specified in the W.P.B. procedure *(5)*. Lot 3 required about three times the specified plastication before it formed a band without holes. After the addition of all ingredients, the batches were mixed in accordance with the A.S.T.M. procedure *(6)*.

Within 4 to 24 hours after milling, the stocks were cured. Tensile strength, ultimate elongation, and modulus at 500% elongation were determined on sheets cured for 15, 25, 35, and 50 minutes at 310° F. The optimum cure determined from modulus data for all stocks was found to be 25 minutes at 310° F. Dumbbell specimens cured for the optimum time were oven aged for 46 hours at 194° F. (90° C.) and the tensile properties determined on the aged specimens.

Blocks 1 inch x 1 inch x ½ inch thick were cured 30 minutes at 310° F. The hardness of these blocks was taken with the Pusey and Jones Plastometer. The blocks were then compressed between two chromium-plated plates by a 400-pound load. Within 15 seconds after application of the load, the plates were bolted together carefully so as to maintain the deflection caused by the load. The assembly was then placed in the oven for 46 hours at 194° F. At the end of the period, the specimens were released from the plates and cooled for ½ hour. Their thicknesses were then measured. The percent compression set was computed by dividing the difference between the original and final thicknesses by the original thickness and multiplying by 100.

The swelling of 1 inch x 2 inch x 0.08 inch specimens, cured for the optimum time, was determined after 24 hours immersion in distilled water at 82° F.

The results of these tests are given in Table IV. The tabulated data show that the regular lots were fairly uniform for initial tensile properties except in the undercure. The regular lots were also fairly uniform for compression set and aged tensile properties and were very uniform for Pusey and Jones hardness. However, they showed a wide variation in swelling in water.

Lot 3 was characterized, as formerly, by fast cure, high tensile strength, low elongation, and high modulus. The Pusey and Jones hardness and the compression set were lower than the corresponding values for the regular lots.

Analysis of the tensile data shows that certain lots were consistently outside the standard deviations for one or more of the properties over the range of cure. For example, Lots 6 and 16 had low tensile; Lot 5 had high tensile; Lot 16 had low elongation; Lots 8A, 10, and 13 had high elongation; Lots 10, 13, and 15 had low modulus; Lots 5 and 16A had high modulus. Lots 1, 5, and 15 were outside the respective standard deviations for the majority of the other tests.

The W.P.B. specification tests gave little forewarning of the trend in cured properties of the respective soft gasket stocks. Some of the lots which had moduli below the W.P.B. tolerances also had low moduli in the soft gasket tests. However, there was one outstanding exception—Lot 6 was below the standard deviation in the W.P.B. tests but was above the standard deviation in the soft gasket tests. It is concluded that the W.P.B. specification tests do not give a reliable index of the behavior of GR-S in this soft gasket recipe.

Cable Jacket

The GR-S lots were compared in the cable jacket recipe given below. This cable jacket recipe was taken

* Union No. 8 solvent is a petroleum solvent containing about 50% aromatic hydrocarbons.

† The regular GR-S stocks include the GR-S-St stocks.

from a W.P.B. release *(9)*. Lots 1A, 5A, and 7A were omitted from this part of the investigation because of insufficient quantities on hand.

CABLE JACKET TEST RECIPE

GR-S	100.0
Micronex W-6(EPC)	75.0
Zinc oxide	57.5
Cumar P-25	20.0
Stearic acid	2.0
Altax	0.75
Methyl Zimate	0.75
Sulfur	2.0

The batches were mixed on a 10x20-inch mill. The GR-S was plasticized according to W.P.B. procedure *(5)* except for Lot 3, which required about three times the specified plastication before it would form a band without holes. After all of the ingredients had been added, the batches were given the regular mixing according to A.S.T.M. procedure *(6)*.

Tensile sheets, 0.08-inch thick, were cured in a press 4 to 24 hours after milling. The curing times were 20, 30, 40 and 50 minutes at 275° F. The tensile properties were determined and the optimum cure was found to be 40 minutes from the modulus data. Additional sheets cured for the optimum time were tested for tear resistance, specific resistivity, and dielectric strength. Tear resistance was determined according to the A.S.T.M. procedure *(3)* using Die A.

Specific resistivity and dielectric strength were determined on tensile sheets which had been conditioned for at least one week at 82° F. and 38 per cent relative humidity. The resistivity measurements were made with the General Radio Type 544-B megohm bridge shown in Fig. 1. The sheets were tested between a bottom electrode, 7 inches square, and a top electrode, 2½ inches in diameter. The surface of the electrodes contacting the specimen were wetted with soap solution to insure good electrical contact. The dielectric strength measurements were made at a frequency of 60 cycles per second following the A.S.T.M. short-time procedure *(8)*. Electrodes, ¼-inch in diameter, were used on each side of the specimen.

Results of Cable Jacket Tests

The results of all tests and their statistical analyses are given in Table V. It will be noted that the coefficients of variation for the range of cure data and the other test data are reasonable except in the case of tensile and modulus for the 20-minute cure and specific resistivity. In comparison with the regular lots, Lot 3 had high tensile, low elongation, high modulus, and exceptionally high resistivity. Of the lots which were outside the respective standard deviations, the following were notable: Lot 13 switched from low tensile for the 20 and 30-minute cures to high tensile for the 40 and 50-minute cures; Lot 2 had high tensile; Lots 10 and 12 had low elongation; Lots 1 and 11A had high elongation; Lot 1 had low modulus; Lot 15 had high modulus.

There was no correlation between the lots outside the standard deviations in these tests and the lots outside the tolerances in the W.P.B. tests. There was little correlation between the lots outside the standard deviations in these tests and the lots outside the standard deviations in the W.P.B. tests. It is concluded that the W.P.B. tests do not serve as a guide to the behavior of GR-S in this cable jacket recipe.

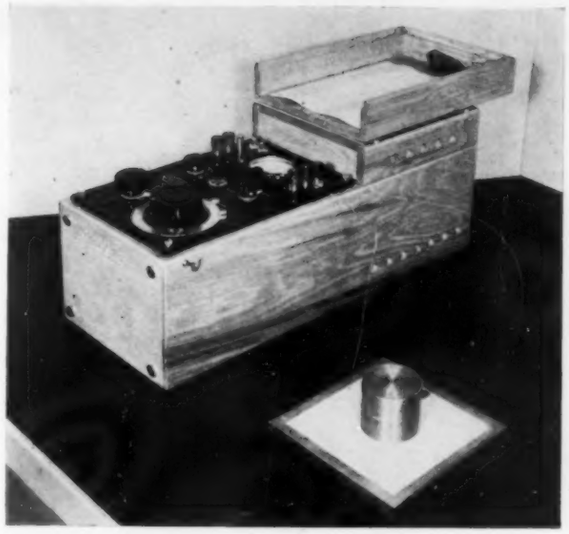


FIG. 1—General Radio Type 544-B Megohm Bridge.

Wire Insulation

The uniformity of the different lots of GR-S was determined in the following recipe for wire insulation. This recipe was taken from a W.P.B. release *(9)*.

WIRE INSULATION TEST RECIPE

GR-S	100.0
Kalvan	57.0
Buca Clay	57.0
Zinc oxide	14.0
Cumar MH2½	36.0
Paraffin	7.0
Stearic acid	0.75
Captax	1.5
Selenac	1.0
Sulfur	2.5

The batch was mixed on a 10x20-inch mill. The Kalvan was added as a masterbatch containing 100 parts of GR-S and 200 parts of Kalvan. The batch was removed from the mill and the mill rolls heated to 170° F. after adding the clay. The batch was then placed back on the mill and the Cumar MH2½ and paraffin added. Following these additions, the batch was removed from the mill and the rolls cooled to 120° F. or less before the addition of the other ingredients. The batch was remilled 18 to 24 hours after mixing.

The stocks were cured in the form of sheets and in the form of wire insulation. Tensile sheets were cured in a press 4 to 24 hours after remilling for 20, 30, 40, 50, and 60 minutes at 275° F. The tensile sheet mold used was as specified by the A.S.T.M. *(7)* except that the cavities were 0.050-inch deep instead of the 0.075-inch specified.

A No. ½ Royle tuber with cross-head was used for the application of the wire insulation. Each stock was tubed onto 3-foot lengths of No. 16 U. S. standard gauge steel wire using a 5/32-inch diameter die. The insulated wires were cured by a method designed to simulate the continuous vulcanization process commonly used in the wire insulation industry. The method consisted essentially of curing the insulated wire under 200 psi steam pressure using a small curing chamber into which the steam could be rapidly introduced. There was a time elapse of 18 to 24 hours between tubing and curing.

TABLE V—CABLE JACKET TEST RESULTS

	Tensile Strength (psi)				Ultimate Elongation (%)				Modulus at 200% Elongation (psi)				Tear Resistance (lbs. per 0.1 inch)	Specific Resistivity (Megohms cm.)	Dielectric Strength (volts per mil)
	20*	30	40	50	20	30	40	50	20	30	40	50	40	40	40
Arithmetical Mean **	1260	1940	2090	2090	630	530	470	420	300	570	760	870	38.4	101	87
Standard Deviation	170	80	80	150	20	20	20	30	40	50	60	70	2.3	33	6
Coefficient of Variation	13	4	4	7	4	5	5	6	12	8	8	8	6	33	7
Lots Outside Standard Deviation—Below Mean	4,8A, 13,15	6,13	6,9, 10,16	6,8,9, 10	10,12, 13,14,15	10,12, 14,16A	6,10,12, 15,16A	10	8A	1,8A	1,11A, 16	1,11A, 16	15,16	14,15	9,10,15
Above Mean	2,5,8	2,12	2,7, 13,15	8A,13, 15	1,7, 8A,11A	1,8A, 11A	1,7	1,4,11A	2,8, 12,14	12,14, 15	10,15, 16A	15,16A	5,8,8A	7,13,16	5,7
Properties of Lot 3 (GR-S-85)	1630	2220	2210	2150	550	460	380	330	450	800	1060	1200	33.9	299	102
Deviation of Lot 3 from Mean	+370	+280	+120	+60	—80	—70	—90	—90	+150	+230	+300	+330	—4.5	+198	+15

* Minutes cure at 275° F. ** Lots 1A, 3, 5A, and 7A not included.

TABLE VI—WIRE INSULATION TEST RESULTS (SHEET CURE)

	Tensile Strength (psi)					Ultimate Elongation (%)					Modulus at 200% Elongation (psi)					Conditioned 2 weeks in air at 82° F. and 38% rel. hum.			Immersed 2 weeks in water at 82° F.			
	20*	30	40	50	60	20	30	40	50	60	20	30	40	50	60	Dielectric Strength (volts per mil)	Dielectric Constant	Power Factor (%)	Dielectric Strength (volts per mil)	Dielectric Constant	Power Factor (%)	Water Absorption (% weight gain)
																50	50	50	50	50	50	50
Arithmetical Mean **	1060	1240	1330	1420	1510	1030	830	710	630	580	100	130	160	200	230	>600	3.71	0.92	400	4.33	1.71	1.58
Standard Deviation	80	120	120	140	130	60	40	30	30	30	10	20	20	20	30	?	0.09	0.05	60	0.09	0.17	0.64
Coefficient of Variation	8	10	9	10	9	6	5	5	5	5	13	17	13	12	13	?	3	6	14	2	10	40
Lots Outside Standard Deviation Below Mean	6,8A, 15	8A, 13	7A,10, 15	6,13, 15	13,15, 16	2,11A, 16	11A, 16	1,8,11A, 15,16	16	16	1,7,9,11	7,16A	16A	7,16A	7	?	none	7A,11, 11A	none	5,5A, 6,12	2,4,6, 11,11A, 12,16	5,5A, 7,7A, 13
Above Mean	1A,2, 11,11A	1A,2, 11A	1A,2,5	1A,2, 5,5A	1A,2, 5,5A	7,7A, 12	7,7A	7,7A	7,7A	7,7A 10	2	2,8A	2,16	2	2,8	?	11,14	5A,13, 16A	5,5A, 7,7A	8,13, 14,16A	7	11,14, 16,16A
Properties of Lot 3 (GR-S-85)	1530	1610	1930	1770	1890	870	690	640	560	540	190	260	320	390	430	>600	3.71	0.94	400	4.44	1.59	1.27
Deviation of Lot 3 from Mean	+470	+370	+600	+350	+380	—160	—140	—70	—70	—40	+90	+130	+160	+190	+200	?	0.0	+0.02	0	+0.11	—0.12	—0.31

* Minutes cure at 275° F. ** Lot 3 not included.

TABLE VII—WIRE INSULATION TEST RESULTS (CURED ON WIRE)

	Tensile Strength (psi)				Ultimate Elongation (%)				Modulus at 200% Elongation (psi)			
	30*	40	50	60	30	40	50	60	30	40	50	60
Arithmetical Mean **	710	950	1030	1060	670	670	670	660	140	150	160	160
Standard Deviation	130	110	120	130	20	20	20	20	20	20	20	20
Coefficient of Variation	18	12	11	12	4	2	3	3	16	12	11	10
Lots Outside Standard Deviation—Below Mean	7,7A, 12,15	7,7A, 15	7,11, 15	7,11, 15	7A,12, 15	none	11,11A, 14,16	11,14, 15	5,7A, 11A,14	none	14	11A
Above Mean	2,9	2,9	2	1A,2	9,13	7A,9	7A	7A	2,16A	2,6,12	2	2
Properties of Lot 3 (GR-S-85)	1310	1450	1610	1680	660	650	650	650	280	280	290	290
Deviation of Lot 3 from Mean	+600	+500	+580	+620	—10	—20	—20	—10	+140	+130	+130	+130

* Seconds cure at 388° F. ** Lot 3 not included. Lot 7A not included in data for 30-second cure because stock was porous.

The important details of the apparatus used for the curing operation are sketched in Fig. 2. Fig. 3 illustrates the same apparatus. The curing chamber was insulated and also kept hot between cures by the use of a steam jacket filled with steam at approximately 130 psi pressure. The rapid entry of 200 psi steam into the curing chamber was brought about by the use of a quick-opening valve at each end of the chamber. The 200 psi steam was generated by a small electrically-heated boiler. The volume of the available steam at 200 psi pressure was increased by the inclusion of the steam-jacketed reservoir shown at the left side of Fig. 2. The steps in the curing cycle are given below, starting at the end of a previous cure (see Fig. 2):

(a) Valves A and B were closed simultaneously 3 seconds before the end of the cure.

(b) Valve C was opened exactly at the end of the cure.

(c) Cap D was immediately unscrewed and the cured wire removed.

(d) The next specimen of insulated wire to be cured was hung on the hook on the inside of cap D and inserted into the curing chamber.

(e) Cap D was screwed into position and valve C closed.

(f) Valves A and B were then opened simultaneously and the curing time started.

A range of cure for 25, 30, 40, 50, and 60 seconds was obtained with each stock.

Tensile strength, ultimate elongation, and modulus at 200% elongation were determined on the sheets and on the insulation which had been removed from the wires. Water absorption was found by immersing the sheets, cured 50 minutes, in distilled water at 82° F. for two weeks. Dielectric strength, specific resistivity, dielectric constant, and power factor were measured on sheets, cured 50 minutes, after being conditioned for two weeks at 82° F. and an ambient humidity of 38%. The electrical tests were also performed on sheets which had been immersed in distilled water at 82° F. for two weeks. The apparatus for measuring specific resistivity is depicted in Fig. 1; the apparatus for measuring dielectric constant and power factor is depicted in Fig. 4.

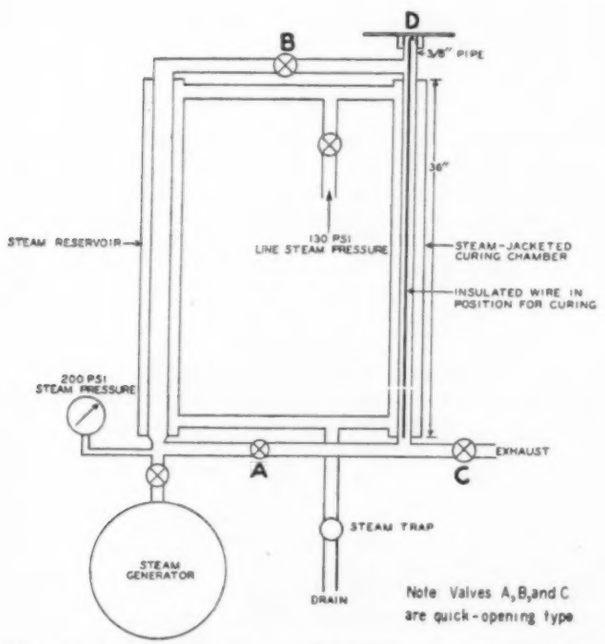


FIG. 2—Apparatus for rapid cure of wire insulation.

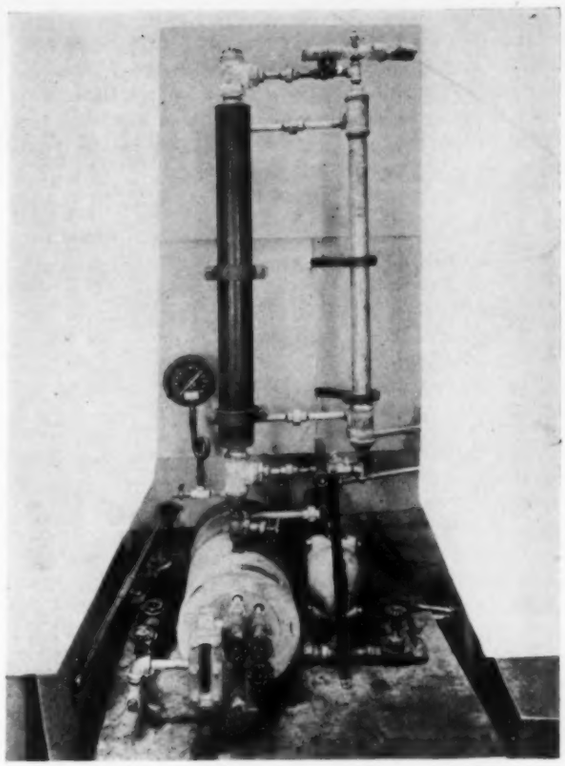


FIG. 3—Apparatus for rapid cure of wire insulation.

The results of the tests on the sheets are given in Table VI; the results of the tests on the insulation are given in Table VII. It will be noted in the former table that specific resistivity data are not listed. This is because all of the specific resistivities were above the range of the megohm bridge, *i. e.*, the specific resistivities before and after immersion were higher than 2×10^8 megohm centimeters. No data are given for the 25-second cures in Table VII because these cures were porous except in the case of Lots 1A, 3, 8, and 17A. The only lot which exhibited porosity in the 30-second cure was Lot 7A.

The comparison of the sheet cures with the wire insulation cures is interesting. The sheets reached roughly the same state of cure in minutes as the wire insulations reached in an equal number of seconds. The sheets attained a mean tensile about 350-400 psi higher than the mean tensile of the wire insulations. The mean elongation and modulus of the wire insulations leveled off higher and lower, respectively, than the mean elongation and modulus for the optimum cure of the sheets. The fact that these values leveled off for the wire insulations with increasing time of cure but did not level off for the sheets is significant. It may be due to the exceedingly high curing temperature used for the wire insulation or the action of the open steam.

Lot 3 had much higher tensile and modulus and somewhat lower elongation than the regular GR-S lots. This was true for both the sheet and wire insulation cures.

A comparison of the lots outside the respective standard deviations for the sheet cures with the lots outside the respective standard deviations for the wire insulation cures shows some correlation. The lots which were consistently outside the standard deviations for a property in the ranges of cure are tabulated below:

	Sheet	*Wire Insulation*
Low Tensile	Lot 15	Lots 7, 15
High Tensile	Lots 1A, 2, 5	Lot 2
Low Elongation	Lots 11A, 16	—
High Elongation	Lots 7, 7A	Lot 7A
Low Modulus	Lots 7, 16A	—
High Modulus	Lot 2	Lot 2

When an attempt is made to find agreement between the lots outside the standard deviations for the wire insulation tests and the lots outside the tolerances for the W.P.B. tests, the usual lack of success is encountered. For example, only Lot 7 of the six lots which were below the W.P.B. tolerance for modulus, was below the standard deviations for modulus in the wire insulation tests—and then only in the case of the sheet cures. Slightly better agreement was obtained between the lots outside the standard deviations for the wire insulation tests and the lots outside the standard deviations for the W.P.B. tests.

The large coefficient of variation found for the water absorptions suggests that this property might be related to the soap content or ash content of the polymer as determined in the W.P.B. chemical tests. The soap content and the ash content of the polymer also had large coefficients of variation. A comparison of these analytical data for the respective GR-S lots with the water absorption data for the same lots indicates that there is a rough relation between ash content and water absorption, but little connection between soap content and water absorption. The relation between ash content and water absorption is plotted in Fig. 5. This graph shows that the water absorption of the wire insulation stock is affected by the ash content of the polymer. A more clear-cut relation would probably exist between the water-soluble content of the ash and water absorption, as pointed out by Kemp (*10*).

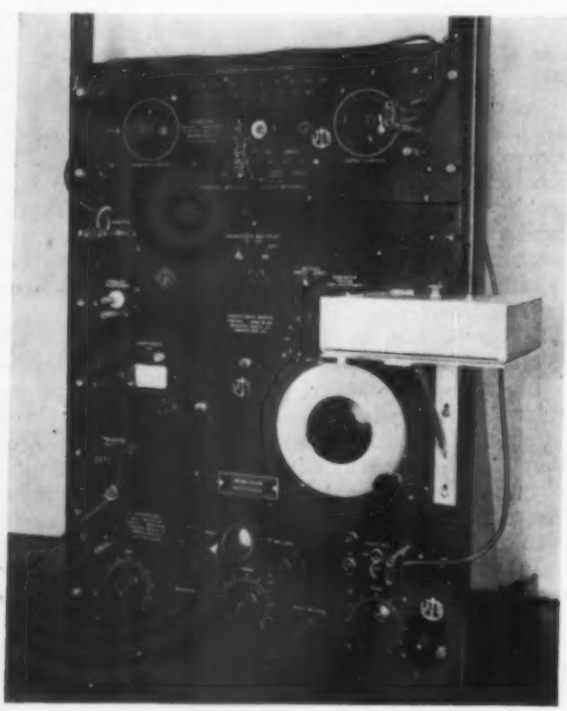


FIG. 4—General Radio apparatus for measuring dielectric constant and power factor at audio frequencies.

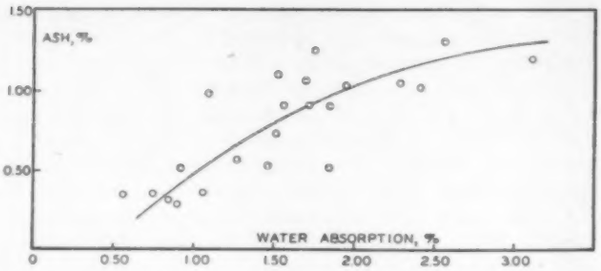


FIG. 5—Relation between water absorption of GR-S wire insulation stock and ash content of the raw GR-S.

Conclusions

Iit is concluded from this investigation that the GR-S being produced during the first months of 1944 was as uniform as could be expected in view of the short time that the industry had been in existence. Except for the undercures, the physical properties of stocks prepared from these GR-S lots generally varied about 10% from their mean values (coefficient of variation). The considerable variation in the properties of the undercures indicates that this feature requires improvement and should be studied first by GR-S manufacturers.

It is further concluded that the W.P.B. specification tests do not necessarily indicate the behavior of GR-S in other recipes.

ACKNOWLEDGMENT

The authors wish to acknowledge the advice of T. A. Werkenthin, Bureau of Ships, Navy Department, and the considerable help given in the laboratory work by the following laboratory personnel: R. Chow, E. R. Evans, R. E. Harmon (now with the Bureau of Ships, Navy Department, Washington, D. C.), G. M. Herscher, and J. C. Montermoso.

LITERATURE CITED

(1) W.P.B. Release INFL-352 of Nov. 9, 1943.
(2) Federal Specification ZZ-R-601a of June 25, 1940, pg. 12.
(3) A.S.T.M. Specification, Designation: D624-41T.
(4) Morris, R. E., Mitton, P., Montermoso, J. C., and Werkenthin, T. A., *Ind. Eng. Chem.*, Vol. 35, p. 646 (1943).
(5) W.P.B. Specification for GR-S of Jan. 1, 1944.
(6) A.S.T.M. Specification, Designation: D15-41.
(7) A.S.T.M. Specification, Designation: D412-41.
(8) A.S.T.M. Specification, Designation: D149-40T.
(9) W.P.B. Release INFL-172 of July 23, 1943.
(10) Kemp, A. R., Ingmanson, J. H., Howard, J. B., and Wallder, V. T., *Ind. Eng. Chem.*, Vol. 36, p. 361 (1944).

A New Method for Determining the Freeze Resistance of Vulcanizates

By JOSEPH A. TALALAY

IT IS WELL KNOWN that natural rubber as well as the synthetic rubbers exhibit pronounced changes in their properties if exposed to low temperatures. To obtain a more detailed understanding of such phenomena, it was decided to study a series of smoked sheet, Buna S, Butyl and neoprene compounds by the use of a somewhat modified ring modulus hardness tester *(1)*.

As indicated in the accompanying schematic drawing (Fig. 1), the following alterations were made: The weight (P) is transferred from the lever (A) inside the apparatus to the beam (A_1), placed symmetrically over the apparatus. Both beams are connected by a bar (C). The beam (A_1) ends in a needle which gives the indication on a scale (B), subdivided into tenths of inches. By this construction, the readings of the beam outside of the apparatus are identical with those on the inside beam.

Lack of play in the bearings of the rod (C) is as essential as lack of bend in the beams. To the vertical rod (C), connecting the two beams, is fixed a corrugated hose (D), made from fabric and covered with a freeze resistant material (*i.e.*, plasticized Neoprene F.R.) This connection permits the rod to move freely and at the same time keeps the box of the apparatus tight, thus preventing changes in temperature.

To prevent the rods used for operating the tester from freezing, they are surrounded by electrically-heated spirals (E) connected with a lamp rheostat (F). This heating is used occasionally for a short time and only when it is necessary. Instead of heating the rods, they may also be wetted with acetone.

The rubber specimens (rings) placed on the pins of the magazine have a tendency to stick together and to avoid this sticking the pins are provided with two springs (G) which hold the remaining specimens on the pins. A control thermostat (H) is also provided.

The purpose of this investigation was to determine the influence of low temperatures on the hardness of natural and synthetic rubber compounds.

In this series of further investigations with the ring modulus hardness (R.M.H.) tester, eleven compounds were prepared (Table I). Only four of these com-

(1) Talalay and Gladstone, A new Apparatus for Determining Hardness and Creep of Synthetic and Natural Rubber Compounds at Various Temperatures, *R.A. (N.Y.)*, Vol. 55, No. 2, pp. 147-152 (May, 1944).

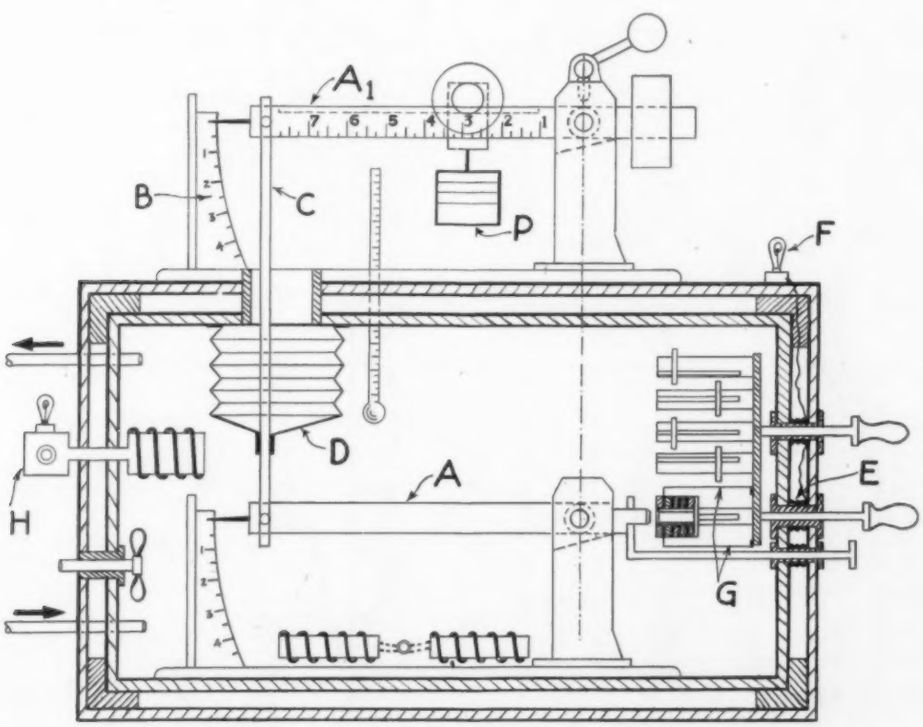


FIG. 1

TABLE I

	1	1A	1B	1C	2	2A	2B	2C	2D	3	4
Neoprene F.R.	100.	100.	100.	100.	....	....	....	....	....	....	....
Ribbed Smoked Sheet	....	....	....	....	100.	100.	100.	100.	100.	....	....
Buna S (GR-S)	....	....	....	....	....	....	....	....	....	100.	....
Butyl (GR-I)	....	....	....	....	....	....	....	....	....	....	100.
Stearic Acid	1.0	0.5	0.5	0.5	1.	1.	1.	1.	1.	1.	3.
SRF Black (Pelletex)	50.	30.	60.	90.	35.	50.	75.	100.	150.	50.	50.
Tributyl Phosphate	30.	2.	4.	6.	....	....	....	....	....	11.	....
Zinc Oxide	....	....	....	....	5.	5.	5.	5.	5.	5.	5.
Litharge	10.	10.	10.	10.	....	....	....	....	....	....	....
Circo Oil	....	....	....	....	3.	2.	4.	6.	8.	....	....
Neozone A	2.	2.	2.	2.	2.	2.	2.	2.	2.	....	....
Sulfur	2.	1.	1.	1.	3.	3.	3.	3.	3.	2.	1.5
Thionex	....	....	....	....	0.3	0.3	0.3	0.3	0.3	0.5	....
Tuads M	....	....	....	....	....	....	....	....	....	....	1.0
Total	195.0	145.5	177.5	209.5	149.3	163.3	192.3	217.3	269.3	169.5	160.5
Curing Time	30'	40'	40'	40'	28'	40'	46'	40'	46'	30'	40'
Curing Temp. (F.)	287°	293°	293°	293°	287°	293°	293°	293°	293°	293°	293°

pounds (1, 2, 3 and 4) were tested for freeze resistance, the remaining seven, together with the first four, being used for drawing correlation curves between hardness data obtained with the Shore (Fig. 2) and Pusey and Jones (Fig. 3) instruments and that of the ring modulus hardness tester.

A constant deviation (deviation = 1") was adopted for all measurements. The scale (B) at the end of the pointer is arbitrarily subdivided into a number of equal divisions (inches and fractions thereof). The moment of the weights about the fulcrum was increased until a constant deviation (D=1) of 1 inch from the zero position of the pointer was obtained. By taking moments about the fulcrum the actual stress in pounds of the ring specimen was calculated at this constant deviation and this stress was taken as the measure of the ring modulus hardness (R.M.H.).

To illustrate this method let us assume the following: If a load of 4 pounds is placed at division 2 to give a deviation of D=1 inch, the moment (M)=4 x 2=8 pounds, which represents a load of 8 pounds applied to the specimen being tested.

From the eleven compounds tested, sheets measuring 6 inches x 6 inches x ¼-inch were prepared and from these sheets ring specimens measuring 1½ inches O.D. x ½-inch I.D. x ¼-inch thick were cut out. The specimens instead of being cut can be obtained by molding the uncured stock.

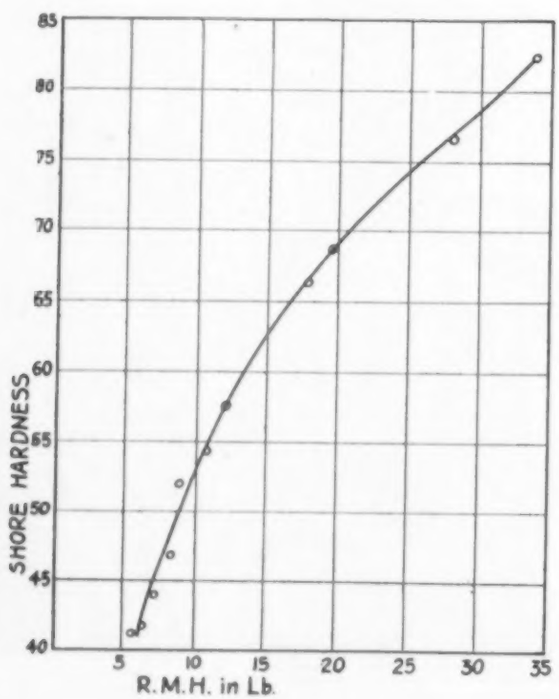


FIG. 2

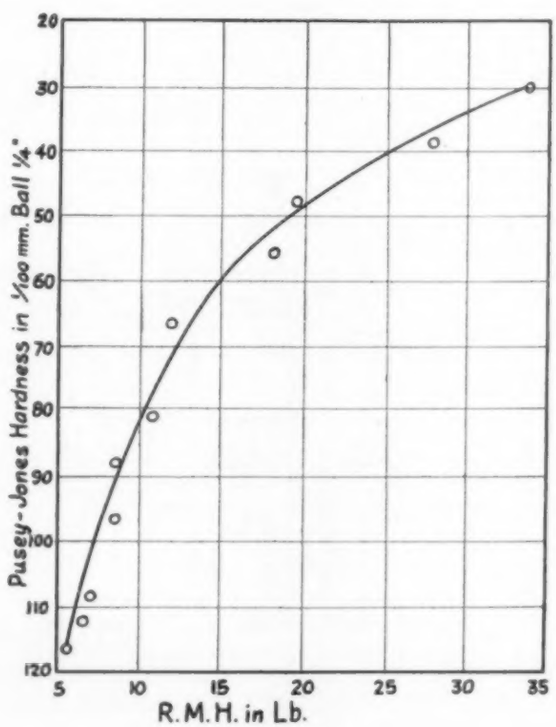


FIG. 3

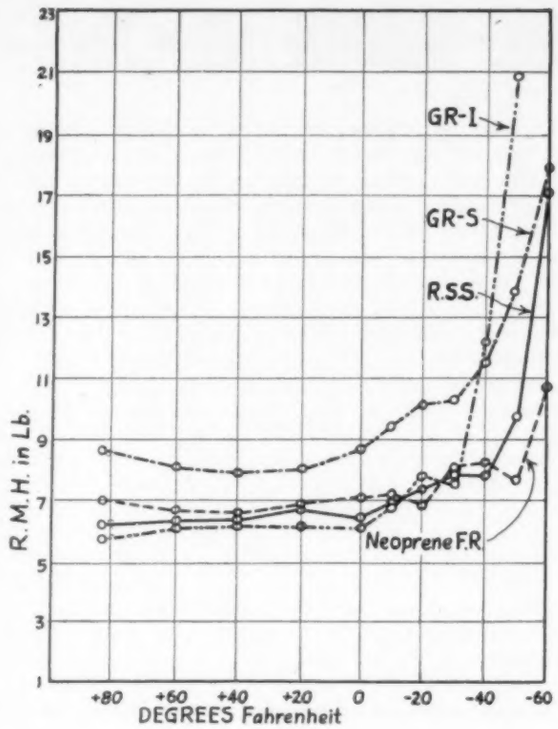


FIG. 4

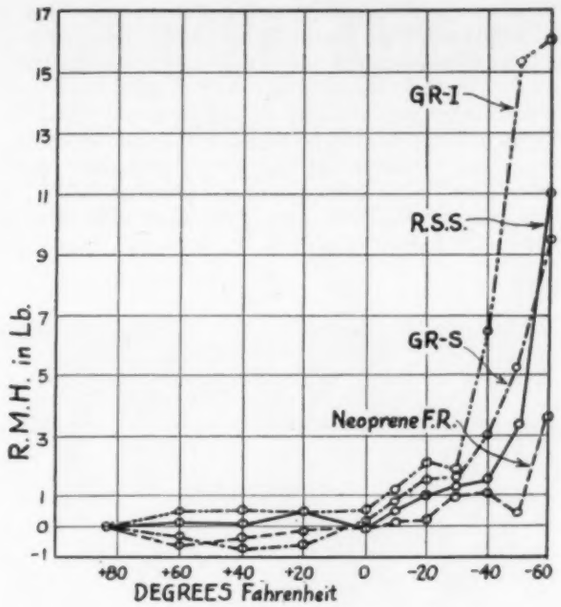


FIG. 5

All hardness data (Shore, Pusey and Jones and R.M.H.) was obtained at a constant temperature of 82° F. The Shore hardness was measured after 30 seconds, the measurements being made on three places of each ring specimen. The Shore apparatus was used with a constant load of 1 kg. The Pusey-Jones hardness was measured with a ball of ¼-inch diameter. As the thickness of 10 m/m and less influenced the indications of hardness, two rings equalling ½-inch thickness were combined for this purpose. Each measurement was made after 60 seconds and an average of 3 measurements was made for each specimen.

If it is desirable to get the readings of Pusey-Jones for ⅛-inch ball from the data for the ¼-inch ball, the following formula can be used

$$h_1 = \frac{1.33h}{1 - 0.6h}$$

where h_1 is the indication of Pusey-Jones with ⅛-inch ball in centimeters and h is the same for a ¼-inch ball, also in centimeters.

The measurement of hardness by using the R.M.H. tester has already been described *(1)*, but without the alterations mentioned above. The measurements were made after 30 seconds, but before measurements were started 15 minutes were allowed after the desired temperature was reached so that the ring specimens could arrive at the temperature of the box. The data obtained is shown in Table II and in Figs. 2 and 3.

Freeze Resistance Data

As stated, the freeze resistance of Compounds 1, 2, 3 and 4 was determined. From each of these compounds 36 ring specimens were prepared and tested at different temperatures ranging from 82° F. to −60° F. After the desired temperature had been established, 15 minutes were allowed to give the specimens enough time to match the temperature of the box. Then the measurements were taken, keeping to the 30 second period as described above.

TABLE II

Compound	4	2	1	2A	3	1A	2B	1B	2C	1C	2D
R.M.H. (Lbs.)	5.56	6.24	7.00	8.16	8.57	10.56	11.92	17.90	19.40	28.00	34.00
Shore	41.0	41.5	43.8	46.7	51.75	54.2	57.4	66.6	68.8	77.0	82.9
Pusey-Jones (¼" ball)	116.7	112.5	109.1	96.4	88.3	80.8	67.1	56.4	48.0	38.2	30.0

TABLE III

(Results shown in pounds)

Temperature	82°F.	60°F.	40°F.	20°F.	0°F.	−10°F.	−20°F.	−30°F.	−40°F.	−50°F.	−60°F.
1—Neoprene FR	7.00	6.56	6.56	6.84	7.08	7.12	6.76	8.00	8.16	7.44	10.64
2—R.S.S.	6.24	6.36	6.32	6.72	6.30	6.88	7.34	7.66	7.76	9.56	17.16
3—GR-S	8.57	8.16	7.88	8.12	8.72	9.40	10.12	10.24	11.52	13.76	17.92
4—GR-I	5.56	5.94	6.12	6.08	6.08	6.80	7.64	7.40	11.96	20.80	21.60

The average data obtained from these experiments is given in Table III. As the thickness of the specimens varied the data obtained was recalculated for the thickness of ¼-inch = 0.250-inch. Figs. 4 and 5 give the same data in graphical form. It will be noted from Fig. 4 that the change of freeze resistance is not so marked as the initial hardness for the four compounds would indicate. By using a common initial point at 82° F., as in Fig. 5, the ordinate of the graphs shows the absolute change of the hardness in R.M.H. units, *i.e.*, in pounds.

Summary

From the curves in Figs. 4 and 5 the freeze resistance of four compounds (1, 2, 3 and 4) can be evaluated.

(1) The compounds behave more or less similarly during the temperature change from 82° F. to 0° F.

(2) Below 0° F. the compounds behave differently, the best freeze resistance being shown by Compound 1 (plasticized Neoprene F.R.). Further, the freeze resistance diminishes in the order of Compounds 2 (smoked sheet), 3 (Buna S), and 4 (Butyl).

(3) There is a particular temperature for each of the four compounds at which a rapid tendency to freeze is evident. Compound 1 begins to freeze at −50° F., Compound 2 at −40° F., Compound 3 at −30° F., and Compound 4 at −30° F.

(4) Correlation curves are given in Figs. 2 and 3 to enable one to compare the data of this investigation with other methods for determining hardness at varying temperatures.

(5) The apparatus described, in simplified form (without cooling box), can be used as a standard apparatus for control of batches in the compounding room by making molded rings in a multi-cavity mold and testing all of the rings from the same compound at the standard temperature of 82° F. by using constant weight of 4 pounds and considering the deviation on the scale which each ring gives. A deviation of plus or minus 2/10th of an inch is permissible, but if the deviation is larger the mixing batch is obviously off and should be checked for lack of uniformity. (See Hauser's "Handbuch der Gesamten Kautschuktechnologie," Vol. I, pp. 340-41.)

ACKNOWLEDGMENT

The author wishes to express his appreciation to Mr. Henry C. Berlin, president of the Converse Rubber Co., Malden, Mass., for his cooperation in enabling this investigation to be undertaken and the results published.

Testing Individual Rubber Life Saving Suits

A QUICK method of testing individual rubber life saving suits, resembling grandmother's inflatable dress form, saved the lives of countless sailors from ships torpedoed at sea, according to the United States Testing Co., Hoboken, N. J. The method reveals tiny leaks and seepages through rubberized fabric coverall suits to permit repairs to be made only where necessary. The test is carried out by inflating the suit with air containing ammonia and detecting the ammonia by the change of color of a dye. The method was developed by the testing company.

In revealing the method, the company explained that in addition to his "Mae West" to keep him afloat, a survivor of a torpedoed ship must be kept thoroughly dry while floating around in the water awaiting rescue. Hours and perhaps days might pass by before rescue and hence the rubber life saving suit, provided to keep the wearer dry, must be absolutely free of leaks—even the most minute pin holes which could cause leakage after continued immersion.

The Water Division of the War Department's Transportation Corps was required to make sure that every rubberized suit be absolutely free of any areas that might possibly leak even after a period of use. Not only must the new suits be in perfect order but each suit must be tested after each round trip, on a transport, since even handling for drills and otherwise might cause damage. The problem could not be solved by the usual methods of detecting penetration (light, the "soap bubble" test, or visual examination) since imperfections not detected by these means could still cause trouble. The United States Testing Co. developed an apparatus for testing each suit individually so fast that all could be examined and repaired very quickly.

The testing technique consists of inflating the life saving suit with ammonia gas mixed with air after all natural openings are made airtight. Under test, a cotton knitted garment tailored to fit the suit is placed over the specimen. The knitted outer garment is dyed with a sensitized yellow dyestuff which turns red in contact with ammonia. Any area of leakage can immediately be spotted from the bright red spot formed where the gaseous mixture pours through the leak. The leak is thus positively located and the area can be repaired at once.

This testing apparatus—there are now eight units in various parts of the country—saved thousands of dollars worth of critical war materials and an incalculable number of sorely needed man-hours by allowing defective suits to be repaired instead of scrapped. This is quite aside from the invaluable lives saved by the suits themselves.

This test for rubber-coated life saving suits reveals leakage of ammonia gas from the inner suit by a change of color of the knitted outer garment and locates the defect for quick repair.

Synthetic Rubber and Its Use in the Airplane

By JANE B. HUTSON

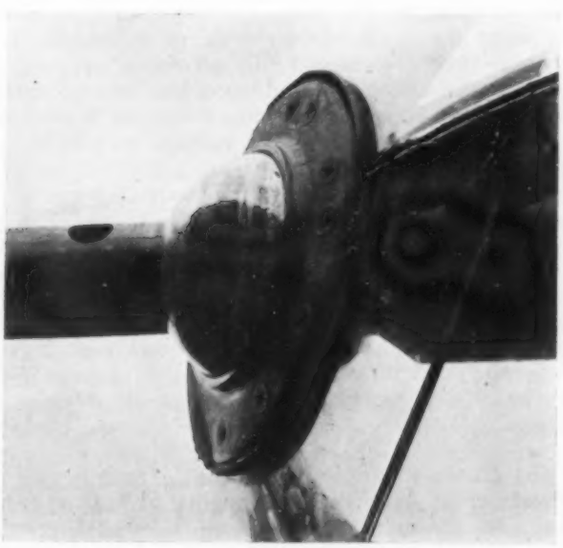
Materials Engineer, Glenn L. Martin Co., Baltimore 3, Maryland

SHORTLY after Pearl Harbor, December 7th, 1941, came the shocking realization of our inadequate rubber stock and our limited chances of replenishment. There remained but one answer — synthetic rubber, or rather synthetic rubbers — materials that until this time had been produced only in limited quantities and were restricted primarily to "specialty" items. It is only appropriate to mention, in passing, that amazing and extensive progress has been made in the compounding and production of synthetic rubber since that memorable date.

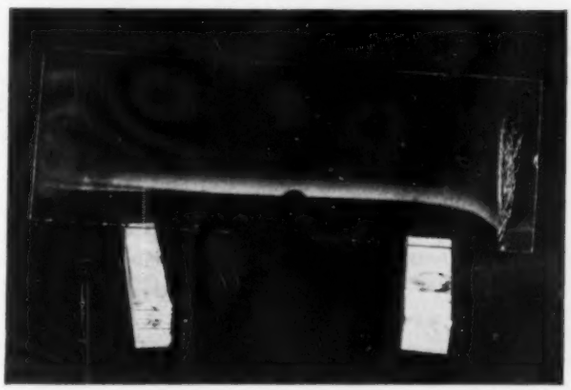
This acute shortage immediately presented a number of problems to the aircraft engineer. He was told that the natural rubber used in the airplane and on accessory items must be reduced to an "irreducible minimum." Where should he begin — from what experience and data could he draw?

The problems presented were threefold. First, what were the available substitutes and how might they be used; secondly, where and what were the parts that could be replaced; and lastly, of the hundreds of variations of available types of materials produced by the rubber companies, what was to be the basis of the choice?

Let us consider the answers to these problems and how they have been worked out in the past two years,



This photograph shows cracking of an airplane turret dome caused by the crazing of the plastic due to the solvent action of the plasticizer used in the compounding of the synthetic rubber sealing strips when in contact with the plastic. See text for explanation.



Close up view of the crazing of methyl-methacrylate plastic caused by the solvent action of ester-type plasticizers used in compounding some types of synthetic rubber.

although the success of this substitution will only be finally proven with time.

Types of Synthetic Rubber

In general, the engineer had the following four basic types of synthetics from which to choose:

1. Butadiene-acrylonitrile copolymers, or Buna N, known by such trade names as Butaprene, Hycar OR-15 and OR-25, Ameripol D, Perbunan, Chemigum I and Thiokol RD. The outstanding properties of this type of synthetic were its oil and solvent resistance, abrasion and heat resistance. Two of its main disadvantages were its poor resistance to sunlight and weather and the difficulty in compounding for extreme low temperature resistance.

2. Butadiene-styrene copolymers, or Buna S (now GR-S), also known by such trade names as Chemigum IV, Hycar OS and Ameripol F. This type more nearly approximates the properties of natural rubber than any of the other synthetics, and is the synthetic that is being produced in the largest quantity by the government. Its outstanding properties are heat and cold resistance, abrasion and oxidation resistance and good electrical properties. Its main disadvantages are lack of oil and solvent resistance and poor tear resistance, although in processing this disadvantage becomes an advantage in the removal of rind or flash.

3. Chloroprene polymers, better known as the neoprenes. Their outstanding properties are sunlight and aging resistance, heat, cold and flame resistance, tear resistance and resistance to the diffusion of gases. There are several types of neoprene, among which are: Type ILS, having superior oil resistance; Type FR,

having excellent low temperature resistance; and Type GN, with the above listed properties, which is being manufactured by the government and is designated by the symbol GR-M. The main disadvantage of Neoprene GN and FR is the high swelling in presence of aromatics, although the retention of physical properties is good.

4. Organic polysulfides, known by the trade name of Thiokol FA. This type is the most solvent resistant of the synthetics, but it has poor compression set properties, exhibiting a tendency to take permanent set or "flow" under applications of heat and pressure, and it has a limited temperature range of application.

These types offered the airframe designer his only choice of synthetic materials, as Butyl, at that time, and even at present, was and is being produced only in limited quantities. In addition, there were the rubber-like plastics such as the plasticized polyvinyl chloride and acetate polymers. Due to their other uses they were not considered for the broad class of general applications but rather for "special applications."

Even with this choice, however, there are certain properties of natural rubber that none of the synthetics have been able to equal, namely, resistance to heat build-up, tearing, flexing and electrical properties, such as dielectric strength and moisture resistance. On the other hand, certain types of the synthetics surpass natural rubber in solvent and sunlight resistance and aging properties. The materials engineer is offered a further choice in the use of blends of two of the above materials or blends of one of the above materials with such plastics as polyvinyl chloride. This improves the inferior properties of one by blending it with the superior properties of the other. Extensive research is currently being conducted on these blends, especially concerning the correlation of the proportion of the compound added and the resultant raise in the desired property.

Uses and Applications in the Airplane

Next in order, the design engineer had to determine where these substitutions were to be made and what the substitute should be. The use of rubber in aircraft can be appreciated by the fact that there are approximately 1600 items carried in current stock lists of this aircraft plant. For the sake of simplification we shall attempt to classify these applications in the following manner: (1) Tires and Tubes; (2) Self Sealing Fuel Cells and Tanks; (3) Hose and Tubing; (4) Vibration Insulators; and (5) Miscellaneous Parts —Gaskets, Washers, Packings, etc.

While there are basic properties, such as durometer or relative hardness, to be considered for every application, each application must be considered in the light of specific requisites for that specific application. We shall consider the basic requirements for the classifications mentioned. It must be remembered, however, that in the manufacturing of airframes for our armed services there are definite government regulations and specifications that must be followed in the use of materials.

(1) *Tires and Tubes:* Perhaps the greatest amount of natural rubber used in any single application was that used in the manufacture of tires for aircraft. These tires must be able to carry extreme loads with the least possible material and must withstand the heavy impact of landings plus the high rotational speed of the wheels. In addition to these requirements are the obvious requirements of resistance to the action of sunlight and weather and resistance to cutting, abrasion, tear and flexing.

One of the greatest problems was the higher heat build-up of the synthetics. This makes it necessary to have tire carcasses made of rayon cord, since the cotton cords will not withstand this heat. The recent shortage in the rayon field has aided in the delay of any general changeover to all-synthetic tires for aircraft.

A consideration of each of the above mentioned requisites is indicative of the problems facing those concerned in the manufacture of synthetic tires. No synthetic has been able to equal natural rubber in the important properties of resilience, heat build-up, tear and flexing resistance. And for these reasons, with the added importance of the success of the tire, the general changeover to synthetics has been slower than for perhaps any other single type of application.

GR-S has been chosen as the "tire" rubber and considerable progress has been made in the testing and use of it in tires. It should be noted, however, that the total mileage expectancy is increased threefold, in synthetics, when loads are dropped to Tire and Rim Association Standard from thirty percent overload.* The main weaknesses of the synthetic tire are cracking and splitting due to excess heat from overloading and high speeds.

The Services are only currently revising specifications that will cover the general use of synthetics for aircraft tires—and even in this revision the use of a small percentage of natural rubber will be permitted to increase such properties as adhesion.

(2) *Self Sealing Fuel Cells and Tanks:* Other products which have been heavy users of natural rubber are the self-sealing fuel tanks and cells. The success of these products has been dependent on the swelling action of the sealant when it comes in contact with aviation fuel. Because of this necessary swelling, the sealant layer of the cells and tanks had been of natural rubber. However, the amount of natural rubber permitted in the sealant has been reduced to a maximum of 37.5%. GR-S exhibits the same tendency to swell in the presence of aromatics, and many cells and tanks, at present, are of all synthetic construction—GR-S for the exterior and sealant layers, and Buna N, aromatic fuel resistant, for the liner. The main difficulty encountered has been the cracking of the Buna N at sub-zero temperatures. While, relatively speaking, the synthetic sealant does not seal as quickly or as permanently as natural rubber, cells and tanks of all-synthetic construction have given quite satisfactory service.

(3) *Hose and Tubing:* Perhaps the next largest use of rubber or synthetics is for the various types of hose used throughout the airplane. The substitution of synthetic for natural in this case has been more successful than in the preceding cases, since the substitution here was started before the drastic curtailment of natural rubber, and has reached 100% conversion. This is largely due to the fact that again the use dictates the type of material and one of the greatest advantages of the synthetics over natural rubber is their

* Paper on "Synthetic Rubber Tires and Inner Tubes" by P. M. Torrance, Firestone Tire and Rubber Company, presented at the A.S.T.M. Symposium on Synthetic Rubbers, March, 1944, Cincinnati, Ohio.

PROPERTY RELATION OF NATURAL AND SYNTHETIC RUBBER

(COMPARISON TO RUBBER)

Property	Natural Rubber	Neoprene	Thiokol	Ameripol D (Buna N)	Ameripol F (Buna S)	Butyl	Hycar
Workability	Excellent	Good	Fair	Good	Fair	Good	Good
Vulcanizing Properties	Excellent	Excellent	Fair	Excellent	Excellent	Fair	Excellent
Adhesion to Metals	Excellent	Excellent	Poor	Excellent	Excellent	Poor to Fair	Excellent
Adhesion to Fabrics	Excellent	Excellent	Fair	Good	Fair	Good	Excellent
Resistance to Swelling in Lubricating Oil	Poor	Good	Excellent	Excellent	Poor	Poor	Excellent
Resistance to Deterioration in Oil	Poor	Excellent	Excellent	Good	Poor	Poor	Excellent
Resistance to Hydrocarbons (benzol, xylol, carbon tetrachloride, etc.)	Poor	Excellent	Fair	Excellent	Poor	Poor	Good
Resistance to Lacquer Solvents	Poor	Poor	Good	Fair	Poor	Poor	Fair
Dielectric Strength *	Excellent	Fair	Fair	Fair	Excellent	.....	Fair
Electrical Conductivity	Fair	Fair	Fair	Fair	Fair	.....	Fair
Resistance to Water Absorption *	Fair	Good	Fair	Fair	Good	Good	Excellent
Resistance to Strong Oxidizing Agents	Poor	Poor	Poor	Poor	Poor	Good	Poor
Resistance to Other Corrosives	Good	Good	Good	Good	Good	Good	Good
Tensile Strength	Excellent	Good	Fair	Excellent	Good	Fair	Excellent
Elongation	Excellent	Excellent	Fair	Excellent	Good	Excellent	Excellent
Resistance to Cold Flow *	Excellent	Good	Poor	Excellent	Good	Poor	Excellent
Resistance to Sunlight *	Fair	Excellent	Excellent	Good	Fair	Excellent	Good
Resistance to Ozone	Fair	Excellent	Excellent	Good	Poor	Excellent	Good
Resistance to Aging	Good	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent
Approximate Specific Gravity	.93	1.25	1.35	1.00	.94	.90	1.00
Heat Resistance *	Good	Excellent	Poor	Excellent	Excellent	Excellent	Excellent
Flame Resistance	Poor	Good	Poor	Poor	Poor	Poor	Fair
Cold Resistance	Excellent	Good †	Poor	Fair	Good	Excellent	Good
Abrasion and Tear Resistance	Excellent	Good	Poor	Excellent	Fair to Good	Fair-Good	Excellent
Hardness Range	20-100	20-90	25-80	20-100	35-100	15-75	10-100
Freedom from Odor	Good	Fair	Poor	Fair	Fair	Good	Fair

* These properties available only in specific compounds. † FR type excellent.

solvent resistance. The main types of hose in aircraft are as follows:

a. Fuel, Oil and Coolant Hose—Until recently, for the sake of standardization, the same hose was specified for these three applications. But here, as is often the case, certain properties cannot be combined in the same compound without sacrificing others. In such an event one must either choose the most important property or select different materials for different applications. Therefore, the services no longer cover fuel, oil and coolant hose by one specification, but fuel hose by one and oil and coolant by another.

The use of aviation fuel, a medium octane fuel with added aromatics, presented a serious problem, since natural rubber and several synthetics have a high percentage swell in this fuel. Thiokol, the least affected by these solvents, seemed the logical choice and was the first used. But, here again, another problem arose in that, under the compression of the hose clamps, Thiokol was apt to flow and take a permanent set which narrowed the opening of the hose and caused loosening of the clamps reducing the blow-off pressure. Also, the operating temperature range of Thiokol was limited, so that later requirements of low temperature resistance would have prohibited its use. The next best aromatic resistant material is Buna N. However, again, a sacrifice of one property had to be made due to the greater necessity for another. The general Army requirement of low temperature flexibility (—65°F.) had to be waived for the more important property of aromatic resistance since, to date, an aromatic resistant hose has not been developed that is satisfactory for extensive cold weather use.

Still another problem, surface cracking and checking, was encountered in the Buna N type of hose due to its relatively poor flexing resistance. However, because of its aromatic fuel resistance, Buna N has continued to be used for fuel hose. Oil and coolant hose are now being manufactured from neoprene due to its superior flexing and low temperature resistance.

b. Hydraulic Hose—In addition to the necessary hydraulic fluid resistance, this type of hose has the added requirement that it must be satisfactory for use in a temperature range of —65°F. to +165°F. To date, neoprene has been found to be the most satisfactory material for this type of hose.

c. Miscellaneous Hose and Tubing—In addition to the above types, which cover the majority of hose in aircraft, there are a number of miscellaneous applications where the material again is decided by use. For example, battery drain tubing is being manufactured from polyvinyl chloride compounds due to its superior acid resistance. Butyl will also be a possible material for this use. Other applications, such as relief tubing, may satisfactorily employ reclaimed rubber.

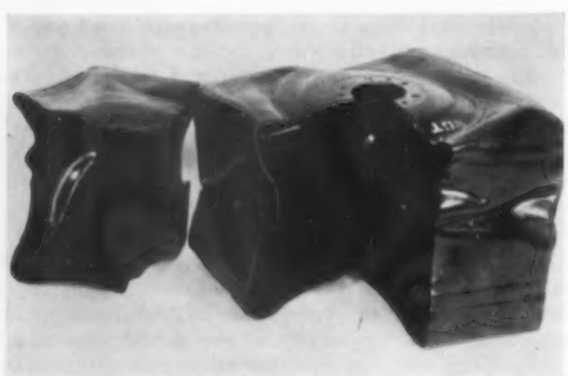
(4) *Insulation Vibrators:* The primary requisite of vibration insulators, used to insulate an instrument, a piece of equipment, or a completely assembled instrument board from vibrations occurring in the aircraft structure on which the article is mounted, is naturally resilience, and particularly at low temperatures. No synthetic can equal natural rubber in resilience even at room temperatures and, consequently, the Services are still requiring the use of natural rubber as the elastic material for all approved insulators. Tests by the Army have shown that the synthetics have not retained the necessary resilience at extreme low temperatures, although work is still in progress to find

a satisfactory substitute. It seems probable that further research might indicate that such a substitute might be available in neoprene, which has the best resiliency of all the synthetics, good low temperature resistance and the added property of superior oil resistance in comparison to natural rubber. Some difficulty has been encountered by the cracking of natural rubber, which is probably due to the effects of hot oil.

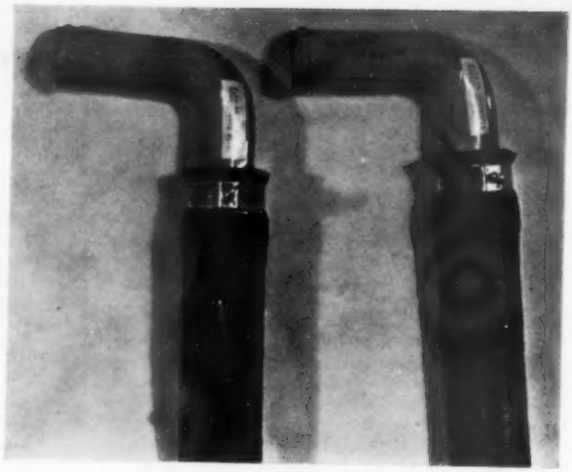
(5) *Miscellaneous Parts:* There are, of course, numerous small articles, such as grommets, washers, etc., used throughout the plane. And here again the most obvious requirement is not always the most important or the only one to be considered. An example of this is aptly illustrated in the general changeover from neoprene to Buna N, as aromatic resistance was made an almost general requirement. In the same manner, low temperature resistance was later specified for all synthetic rubber parts. True, Buna N gave satisfactory aromatic resistance, but unfortunately there developed an almost "plague" of crazing of the methyl-methacrylate plastics used in the turret domes and other parts when in contact with this material. The cleaners and cements were tested and eliminated as the cause of this condition. The obvious answer appeared to be another type of synthetic, but it was discovered that this same crazing also occurred when neoprene was used. It was then found that it was not the basic material that was to blame, but the type of plasticizer used—the solvent action of all ester type plasticizers was causing this crazing, cementing difficulties and softening of paints.

Another common error, at first, was specifying Buna N for use on the exterior of the plane, and then having cracking or surface checking occur due to its poor weathering resistance. At present, neoprene or GR-S compounded for this property are generally specified. Current work on the blending of Buna N with polyvinyl chloride plastic might help to alleviate this problem, but it must be remembered that this blend will probably result in lowered low temperature flexibility and compression set resistance.

These were some of the problems facing the aircraft designer and engineer. Not only did he have to consider the material used in specific applications from a property standpoint, but also from the processing side of the picture, for the manufacture of products from synthetics could not always follow the method used in the manufacture of similar natural rubber products. Often a choice has had to be rescinded, due to these processing difficulties, particularly of the softer compounds with a durometer hardness of less than 50. Also, the properties of manufactured extruded and molded products differ somewhat from those indicated by laboratory-tested specimens.



Marcng fuel cell after being sloshed with engine oil for 500 hours at 225° F.



This view illustrates the compressive action of hose clamps, tightened to 25 inch pounds torque, on self-sealing fuel hose.

In summarizing the choice of materials it is necessary to consider not only the primary requirement of the application, such as solvent resistance, but also the existant conditions in which the part will operate—including the temperature range, whether the part will be under load or subject to flexing or abrasion and the location of the part. Sometimes it is necessary to sacrifice one property for another. After the selection of the suitable material, the availability and processing problems must be considered.

Standardization of Synthetic Rubbers

Finally, after the necessary requirements were determined and possibly the type of material desired decided upon, the question of how this material was to be ordered arose. What criteria were to be used and what numerical values would be indicative of the service life? Each manufacturer had hundreds of different stocks—how was the designer to specify material in a manner that would indicate the proper stock to the manufacturer?

The first most important work done in the standardization of synthetics was the formulating of a series of synthetic rubber specifications by the Materials and Process Committee of the Society of Automotive Engineers. This group deserves sincere commendation for the necessary and complete work that they did. Their experience and available data were naturally limited, but from what information they could accumulate from both consumer and producer interests they set up standards that at least were a working goal. Later, after the manufacturers had attempted to manufacture stocks to these standards and these stocks had been tested and used by the consumer, another meeting was held and the experience gained from the time of issue of the specifications to that date was summarized, studied and the specifications revised as necessary.

A few of the problems encountered to meet these specifications may be summarized as follows: It is difficult to compound a stock to meet both an extreme high temperature requirement (212°F.) and the extreme low temperature requirement (—70°F.) It is also difficult to get both good aromatic resistance, with a high retention of original properties and low swell, and low temperature flexibility. Oven aging, as an additional requirement, presents further difficulty. Today, most of these specifications, which are for specialized materials of high quality necessary to aircraft manufacturers, can be met by the rubber companies.

The Army has issued a more general specification to cover materials of different hardnesses and has divided them into two general classes—weather-resistant and aromatic-resistant. The chief difficulty of the manufacturers in meeting this specification has been in the case of the weather-resistant compounds meeting the compression set requirements, and the tendency of certain neoprene type materials to exhibit shrinkage in engine lubricating oil due to the extraction of certain softeners in the compound.

Another admirable piece of work was the classification done by section 4 of Technical Committee "A", a joint SAE-ASTM Committee. This is a general classification with the optional use of suffix letters to denote special requirements. This classification permits a wider choice of compounds than the A.M.S. specifications which are more specialized. Both the Army and Navy have incorporated this classification into their own specifications.

It should be realized that any attempt at standardization must be based on standard test procedures and adequate definitions of properties to have significance. From these already established standards, it can be seen that this work has progressed with the same admirable rapidity as the production of synthetics. It prevented the lag that might naturally tend to develop between the production and the proper use of the synthetics.

In closing, the author would like to again point out that the chief fault of both the layman and the engineer in their efforts to effect the tremendous changeover from natural to synthetic rubber has been the attempt at generalizations based on a few exceptional results. Each different stock of each type of synthetic will exhibit a different set of properties, and each application must be considered from the standpoint of the requirements of that specific application and the properties of a specific compound. The quickest approach to disaster for the person responsible for the specification of materials is through generalization rather than specialization.

Reports on a Few Recent Accidents in Rubber Factories

TWO employees in a plant manufacturing rubber heels and other rubber products were handling rubber cement by means of air pressure applied to a drum. The exact circumstances surrounding the cause of the fire are not clear, as the two employees involved were burned to death. It is believed, however, that excess air pressure was applied to the drum, and either the drum or the connected equipment ruptured, spraying the rubber cement over the employees. There was an ordinary electric drop light, not of the explosion-proof type, immediately adjacent to this equipment, and it was considered the probable source of ignition.

Automatic sprinklers operated promptly and held the fire in check, but the area was full of smoke and there was great confusion among employees trying to make their escape. Unfortunately the sprinklers were ordered shut off, and the fire then spread rapidly, but was checked in other sections where the sprinklers were still in operation. Attempts were then made to reopen the closed sprinkler valve, but it could not be reached. The fire department arrived and directed hose streams into the burning area. The fire was finally extinguished, but the loss was $250,000.

Calender Accident

A serious calender accident took place recently. The employee's hand was drawn into the bite of the calender rolls to within one-half inch of the wrist. The cause of the accident was the fact that the horizontal trip bar in front of the bite of the lower two rolls on the calender was too far above the face of the lower calender roll, permitting the man's hand to reach the bite of the rolls before his hand tripped the automatic safety which was the horizontal finger bar.

The finger bar had been placed in this position in order to permit the insertion of a feed board at the in-running point between the middle and lower rolls, but this feed board had been removed and the calender was being operated with a gap of approximately three and one-half inches which permitted the hand to enter the bite of the roll.

Foremen and supervisors should be instructed that no calender should be operated where it is possible for the employee to reach the bite either under, over, or through the finger bars protecting the bite of the roll. We have had several serious calender accidents during the past few years, and in every case they have taken place because either the finger bars at the bite of the calender rolls were missing or the employees were able to reach the bite of the calender rolls.

It is the standard policy of most companies that the lower bite on calender rolls must be properly guarded, and all calender operators should personally operate the safety controls on the calender at least once a shift.

Belt Press Accident

A helper on a belt press was standing between a clamp and a supporting bar while making adjustments to the belting. The operator of the press, not knowing of the helper's position, started the clamp moving in a forward position causing the helper's head to be caught between the clamp and the supporting bar. When the helper screamed, the operator immediately stopped the clamp and placed it in reverse. Had he not done this, without a doubt a fatal accident could have resulted; instead of the helper's just receiving a minor injury.

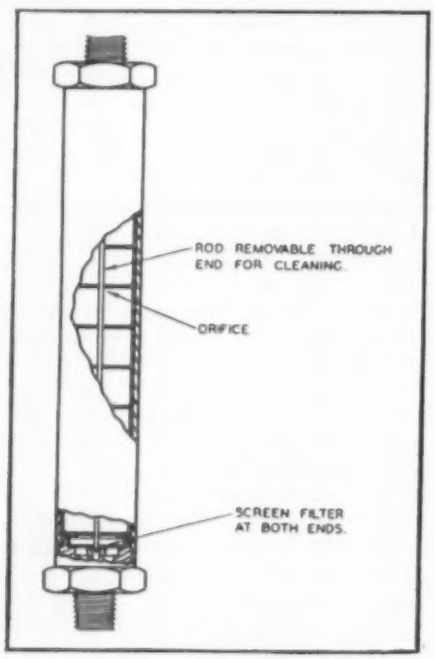
To prevent recurrence, all helpers have been instructed to notify the operators at all times of their whereabouts. The operators have been re-instructed not to start any part of the belt press moving before making sure that no one is in the way of the moving parts.

Rubber Safety News Letter

Taylor Pulsation Damping Unit

To overcome the difficulties associated with the variable orifice and fixed orifice type devices for the measurement of pressure and flow of an oscillatory nature and possessing amplitudes of 1% or more of full-scale range, the Taylor Instrument Companies, Rochester, N. Y., have developed a new type of pulsation unit. The new unit is universal in application, non-adjustable, and is said to deliver an output pressure which is essentially equal to the average flow of the pulsating input pressure.

The instrument has no moving parts, nor is there need for any external adjustment to be made. It consists of a series of alternate small capacities or volumes and orifices. As the pressure wave enters the device, a differential occurs across the first orifice which causes a flow through it, thus raising the pressure in the adjacent chamber. This in turn causes a flow through the



next orifice, producing similar effects except with decreased intensity.

While this "above-average" value of the pressure wave is making its way through the series of chambers, the pressure drops below the average value, since it is a pulsating one, causing a reversal of the flow process. Thus, the various capacities "breathe" with decreasing intensity as the waves pass through the damping unit, until finally a point is reached where the pressure level lies approximately at its average value.

To overcome the difficulty of plugging, fine mesh screens are provided at both the entrance and exit of the damping unit. In addition, a rod which passes axially through the series of orifices can be readily removed, thus exposing a large orifice area for simple and effective cleaning. The device is completely free of gaskets and the caps are welded to the tubes to provide leak-proof construction. The unit is subjected to a static pressure test of 3,000 psi and bears a working pressure rating of 1,500 psi. Adaptation of the unit to liquid or gas service is accomplished by using one of the two rods supplied at the time of installation.

Self-Contained Laboratory Oven

A streamlined, compact and completely self-contained oven, designed for laboratory and pilot plant use, has been developed by the Industrial Oven Engineering Co., 11621 Detroit Ave., Cleveland 2, Ohio. Sizes of oven working space in the new oven range from 3 feet by 3 feet by 3 feet to 6 feet by 6 feet by 6 feet, in increments of 1 foot, and special sizes are fur-

nished to specification. Temperatures range up to 900° F., with a guaranteed differential of plus or minus 2 degrees. This type of oven is usually furnished with electrical heating equipment, but is designed to use any type of fuel. In every case, the heating equipment is contained within the oven shell. The smaller models are shipped assembled, ready to connect to the heat source.

The oven is designed particularly for precision experimental work in drying, baking evaporating, polymerizing, aging and heat treating, especially in cases where highly volatile solvents are used. Regardless of the inflammability or explosiveness of the solvents, the oven has insurance company approval. It can be furnished with special construction to withstand corrosive fumes, and with exterior baked enamel finishes in a variety of colors to harmonize with surroundings. Automatic temperature controls are provided to suit the processes for which the oven is to be used.

Hydraulic Elevating Table

The Revolvator Co., North Bergen, N. J., has brought out a new hydraulic elevating table useful for raising heavy material and molds to a level convenient for the operator. The table is operated by an hydraulic mechanism employing conveniently located foot pedals. the running gear consists of two rigid and two swivel roller and ball bearing casters of semi-steel or composition rubber tires. A readily removable push bar is usually furnished with the table. The platform is generally constructed of smooth steel, but regular reversible roller and ball transfer tops are also available.

Abstracts of United States Patents on the Compounding and Use of Synthetic Rubber

By FREDERICK MARCHIONNA, M. S. Chem.

Part XVIII

Geer—U. S. Pat. 2,335,405—Nov. 30, 1943. *Golf Ball Cover Material.*

A tough balata-like material, particularly suitable for molding as a cover over the ordinary golf ball core, contains a mixture of curded and insolubilized protein from milk from which the butter has been removed, or evaporated or condensed milk, or preferably skim milk, which is homogeneously combined with rubber latex using from 65 to 75 parts of protein solids to 100 parts of rubber. The mixture is preferably prepared by mixing the milk with the latex in the required quantity, curdling the mixture by heating or by the addition of acetic acid, and then treating the curd with formaldehyde, acetaldehyde, propionaldehyde, crotonaldehyde, or aluminum chloride, zinc sulfate, etc. Thus, four liters of skim milk containing 120 grs. of solids are mixed with 282 grs. of 60% ammonia-preserved latex. This mixture is curded by adding 40 cc. of glacial acetic acid in 200 cc. of water and heating at about 50° C. from ½ to 1½ hours. About 40 to 45 cc. of a 40% formaldehyde are then added and the mixture heated at 50° C. to render the protein in the milk insoluble. The resulting curd is filtered in a cheese cloth, washed in running water, and pressed slightly to remove much of the water. This wet curd, which contains about 50% of water, is then milled at 150° to 160° F. and compounded with 51.5 parts of titanium oxide, 17.1 parts of zinc oxide, 5.1 parts of sulfur, 0.86 part of diphenyl guanidine, and 0.5 part of zinc dibutyl dithiocarbamate. While it is still damp with about 10% of moisture, it is molded over the golf ball core and vulcanized at 220° F. for 10 minutes. It is said that during milling and sheeting, the continuous phase of the milk is broken to produce a dispersion of the milk protein in the rubber. The latex in the above example may be from natural rubber, latex, polychloroprene, or from an interpolymer of butadiene with acrylic nitrile, styrene, alkyl methacrylate, or the natural rubber latex may be replaced in part with a latex from any of these polymers. A suitable quantity of a cyclized rubber, such as Thermoprene, produced as described in U. S. Pat. 1,605,180, or chlorinated rubber, etc., in the form of an aqueous dispersion, may be added to the milk-rubber latex mixture before curding.

Coffman—U. S. Pat. 2,335,582—Nov. 30, 1943. *Water-Repellent Fabrics.* (Assigned to E. I. du Pont de Nemours & Co., Wilmington, Del.).

Fabrics from cellulose fibers are rendered water-repellent by impregnation with a solution of a copolymer of a 1-alkenyl isocyanate with a polymerizable vinyl or vinylidene compound. After removal of the solvent by evaporation, the fabric is heated to effect the desired reaction. The copolymer used in the method may be from a mixture of 1-butenyl, 1-phenylvinyl, propenyl, 1-methyl propenyl, styryl, 1-para chloro phenlyvinyl, 2-naphthyl vinyl, 1-ethoxyvinyl, 1-phenoxyvinyl, 1-octa decylvinyl, 1-cyclohexyl vinyl, and 2-laurylvinyl isocynate with a vinyl or vinylidene compound including alkyl acrylate and methacrylate acrylic nitrate, divinyl acetylene, chloroprene, butadiene, isoprene, styrene, etc. The different monomers may be used in quantities from 99 to 1% of the isocyanate to 1 to 99% of the vinyl compound. In one example, a piece of cotton cloth is dipped in a 4% benzene solution of a 5:95 methacrylylisothiocyanate: styrene or chloroprene, or butadiene interpolymers obtained by heating the monomer mixture in the presence of 1% benzoyl peroxide at 70° C. The cloth so impregnated is air dried and then baked at a temperature of 150° C. for about 5 minutes. Such a finished cloth is found to have an initial water repellency of 50 and a repellency of 40 after having been laundered. The treatment may be effected also with a hot melt of the interpolymer, provided that its melting point is below 100° C. Silk, wool, viscose or acetate rayon fibers may be similarly treated.

Schur and Archer—U. S. Pat. 2,335,702—Nov. 30, 1943. *Artificial Leather.* (Assigned to Brown Co., Berlin, N. H.).

An artificial leather is obtained by impregnating a water-laid or dry-laid fiber web of cellulose, and more particularly alpha-cellulose fiber, with a latex-starch mixture, the starch being in homogeneous condition and its quantity in the composition varying between 10 to 50%. The weight of the binder mixture absorbed by the fiber web may be from 20 to 40%. It is found that unless the starch is homogenized or otherwise treated to reduce the particle size, the absorption of the starch-rubber binder in the fiber web will be poor. Homogenization may be accomplished by passing the starch through a colloid mill, or by treating the starch with an oxidizing or hydrolyzing reagent, or with an enzyme, whereby the particle size of the starch is reduced. In the example, 25 lbs. of tapioca starch are dispersed in 633 lbs. of water and 2.5 lbs. of hypochlorite bleach liquor, having about 10% of available chlorine added. This dispersion is heated gradually up to 185° F. while agitating and then cooled. About 140 lbs. of rubber from a 37% latex, which may be from natural rubber or from polychloroprene, Thiokol, methacrylate polymer, etc., are then incorporated. A felted web of alpha-cellulose fiber is impregnated with this starch-rubber dispersion and dried into a good artificial leather base, which may then be finished with a varnish or enamel surface coating.

Blake—U. S. Pat. 2,335,730—Nov. 30, 1943. *Porous Rubber Products.* (Assigned to Monsanto Chemical Co., St. Louis, Mo.).

Sponge products from natural rubber, polybutadiene, polychloroprene, etc., are obtained by incorporating in the natural or synthetic rubber a diaryl pentadiene which acts as the blowing agent. Thus, a composition comprising natural rubber, polychloroprene, etc., is compounded with 30% of whiting, 5% of zinc oxide, 3% sulfur, 1% of 2,2,4-trimethyl dihydroquinoline, 0.9% of di- (benzo thiazyl thiol) dimethyl urea, 2% of stearic acid, 5% of oleic acid, 20% of a mixture of vegetable and mineral oils, and 1% of the blowing agent, which may be 3-methyl- or 3-ethyl-, 3-butyl-, 3-cyclohexyl-1, 5-diphenyl

pentadiene, or 1, 3, 5-triphenyl pentadiene, or 3-beta-hydroxy ethyl-1, 5-dipara-chloro phenyl pentadiene. The mixture is sheeted, placed on watch glass plates, dusted with zinc stearate, and cured at 155° C. under 22 lbs. of air pressure, thereby obtaining a sponge of uniform porosity.

Beebe—U. S. Pat. 2,336,388—Dec. 7, 1943. *Bonding Rubber to Aluminum.* (Assigned to Scoville Mfg. Co., Waterbury, Conn.).

In a method of bonding a plastic material, such as raw or vulcanized rubber, rubber hydrochloride, chlorinated rubber, polychloroprene, polybutadiene, butadiene-acrylic nitrile interpolymer, etc., to aluminum, the surface of the aluminum to be joined is subjected to the action of a dilute solution of alumina dissolved in an organic acid, *e.g.*, oxalic acid and ammonia, which solution should contain small amounts of impurity of copper, cobalt, iron or nickel dissolved therein, these metal impurities causing better bond between the plastic and the metal. In the example given, the inner or hub portion of a propeller blade from an aluminum alloy is buffed and degreased and then treated with a solution from 40 parts of aluminum phosphate in 20 parts of oxalic acid in 100 parts of water, to which there are added 17 parts of concentrated ammonia and 0.5 part of cuprous hydroxide, this solution being diluted with 750 parts of water and kept at about 180° F. during treatment, which lasts about 20 minutes. The dark colored film formed is rinsed with water and dried. A coating of a polychloroprene cement is spread thereon, dried and a sheet of polychloroprene applied. This assembly is placed in a mold with a curable blowable rubber and subjected to heat and pressure to form an integral article having sponge rubber joined to the aluminum by means of an intermediate polychloroprene layer. A layer of polychloroprene is laid over the sponge rubber layer. The article is finally placed in a finishing mold and subjected to heat and pressure. The treating solution may consist of 2 parts of aluminum phosphate-oxalic solution, as described above, in 750 parts of water, to which there are added 17 parts of concentrated ammonia and 0.5 part of copper thiocyanate or ferric ammonium citrate. A honeycomb-type radiator core can be made by providing a series of aluminum tubes with enlarged end portions, treating these ends with the alumina bath, applying a plastic neoprene or chlorinated rubber, etc., and assembling the tubes in a stack. The resulting radiator core will be tight to water, glycol, etc., and also resistant to vibration.

McCluer and Hafferd—U. S. Pat. 2,337,339—Dec. 21, 1943. *Rubber Mixtures.* (Assigned to Kendall Refining Co., Bradford, Pa.).

A blended composition contains natural Hevea rubber, guayule rubber, polychloroprene, polybutadiene, interpolymers of butadiene with styrene or acrylic nitrile, Thiokol, plasticized polyvinyl chloride (Koroseal), polyisobutylene, etc., with a viscous, high molecular weight material naturally contained in a paraffine base oil and precipitated therefrom by a warm solution of a normally gaseous 2 to 4 carbon atom hydrocarbon solvent. Thus, a heavy paraffine base oil, separated from a propane solution thereof, is blown at an initial temperature of 480° to 500° F. in the presence of air for about 2 hours to form a viscous polymer having an average molecular weight of 1,900 containing at least 40 carbon atoms with a double bond, and having a softening point of 200° F. and an iodine number of about 50. Such a viscous polymer can be incorporated in rubber, polychloroprene, butadiene polymers or interpolymers, Thiokol, etc., either by milling the oil and the polymer together, or by dispersing the polymer in a latex from a natural rubber or from a polybutadiene, etc., or by using a natural latex treated with sodium nitrile. Thus, a latex may be coagulated and dissolved in toluene and from 20 to 40 parts of this mixture then combined with 60 to 80 parts of the viscous polymer. On removal of the toluene, there is recovered a product possessing a high degree of elasticity and which has cohesive as well as adhesive properties which are retained at exceedingly low sub-zero temperatures. Blends of the viscous oily polymer with rubber, or interpolymers of butadiene with styrene or acrylic nitrile, polychloroprene, etc., are particularly suitable for blowing into cellular form with steam.

Hecht and Prillawitz—U. S. Pat. 2,337,464—Dec. 31, 1943. *Composite Articles.* (Vested in Alien Property Custodian, Washington, D. C.).

Composite articles, such as vehicle tires, conveyor belts, etc., are made from a fiber layer bonded to a rubber layer by means of an intermediate binder obtained by the interaction of acetylene with a monomolecular, monovalent alkylated phenol in which the molecular ratio phenol:acetylene is 1:0.3 to 2.5. The alkylated phenol may be butyl phenol, amyl phenol, isododecyl phenol, etc. This reaction product may be incorporated in crude rubber or latex, or a sodium-butadiene polymer, polychloroprene, interpolymer of butadiene with styrene, acrylic ester nitrile, fumaric acid ester, etc. The acetylene-alkylated phenol condensate may be produced as described in U. S. Pats. 2,027,199 or 2,072,825 by causing the acetylene to react with the alkyl phenol at 100° to 300° C. in the presence of an organic salt of zinc or cadmium, and/or an amine. In one example, crude rubber or rubber latex or polychloroprene, polybutadiene, etc., is combined with the acetylene condensate from 1 molecule of para-tertiary butyl phenol and 1.3 molecules of acetylene obtained in the presence of zinc naphthenate or zinc isodocyl phenoxy butyrate, using 7.5 parts of rubber, etc., with 65 parts of the acetylene-alkyl-phenol condensate. Such a composition will have an enhanced adhesive power over a similar adhesive in which rosin replaces the acetylene condensate. In another example, an interpolymer from an emulsion polymerization of 70 parts of butadiene and 30 parts of styrene, which has been subjected to a thermal oxidation plastification, is compounded with 24% of zinc oxide, 7.5% of carbon black, 3 parts of tetrahydronaphthalene, 2 parts of a coal tar distillate, 1.8 parts of sulfur, 0.85 part of benzothiazol-2-sulfen-diethylamide and 5 parts of the condensate from 1 molecule of isododecyl phenol and 1.5 molecules of acetylene prepared at 180° C. in the presence of zinc isododecylphenoxy butyrate. This composition applied to a fabric will adhere strongly thereto and cannot be separated therefrom.

Addenda

Hansel—U. S. Pat. 2,003,934—June 4, 1935. *Grease Retaining Bearing Washer.* (Assigned to Felters Co., Boston, Mass.).

A grease retaining washer for bearings comprises an inner layer of felt or leather, adapted to hold a substantial amount of lubricating oil or grease, and an outer layer of the same material, preferably felt, for the purpose of excluding dust and grit from the bearing. Between these two layers there is sandwiched a thin layer of an oil-resistant polychloroprene so that any oil lubricant from the inner layer will not penetrate to the outer layer. The polychloroprene layer may be applied by coating the faces of the felt layers to be joined with a heavy coating of polychloroprene and then superposing the two layers; or each of the faces of the felt layers to be bonded may be coated with a thin film of polychloroprene cement, followed by calendering a thin ply of polychloroprene on one of the coated layers, and finally joining the two felt layers with the polychloroprene sheet between. The composite structure is then consolidated by heating in a press at 260° F. for about 2¼ hours so as to cure the polychloroprene. Washers of the required size and shape are then cut from the composite sheet.

Browne—U. S. Pat. 2,041,743—May 26, 1936. *Printing Plate Matrix.*

A printing plate matrix of the type in which resin-like running plates may be molded, and which reduces the possibility of chemical damage to expensive half-tone originals, comprises a sulfur-free rubber-like layer capable of large deformations, an intermediate layer of rubber, and a metallic backing, the structure being vulcanized into a unitary matrix element. In the production of this matrix, the chase and the nest usually employed in the art are placed on the lower platen of a press. A laminated sheet of natural rubber having a facing of a polychloroprene composition is placed in the aperture of the platen. Over this laminated sheet there is placed a thin sheet of spring brass, coated with a cement to promote its adhesion

to the rubber. The plunger is then put in place and the matrix molded under heat and pressure to form a unitary vulcanized plate matrix. The polychloroprene facing may consist of the following parts: Polychloroprene (400); magnesium oxide (60); Lorol (6); rosin (20); carbon black (160); zinc oxide (40); a mineral oil (12); and Heliozone (2). Instead of this polychloroprene composition, a rubber composition containing trinitro-benzene as vulcanizing agent may be used.

McCormack—U. S. Pat. 2,075,769—March 30, 1937. *Refrigerator Compressor Seal.* (Assigned to General Motors Corp., Dayton, Ohio).

A shaft seal, specially designed for the refrigerating compressor of a refrigerator, consists of a stationary sealing ring of heat-treated steel alloy which is provided with a sealing face. This ring is sealed to the crank casing wall by means of a gasket and a clamping ring which is secured to the wall by bolts. An axially movable sealing bushing is provided with a metal ring which has a sealing stop face, a stepped cylindrical recess, and a flange portion. This bushing, which contacts and cooperates with the stationary ring, is provided with a resilient and effective sealing packing in the form of a molded member which fits within the movable ring, contacts with the sealing face of the stationary sealing ring, and fits snugly about the shaft of the unit. The resilient packing is preferably made from a polychloroprene mixture which is resistant to the deteriorating action of the common refrigerating gases and lubricants.

Nixon and Ferrell—U. S. Pat. 2,080,736—May 18, 1937. *Packing for Oil Wells.* (Partially assigned to Wilson Supply Co., Houston, Texas).

A packing device that is specially adapted for use in packing off the tubing inside a well casing includes a support, a sleeve which surrounds and is fastened to the support, and a flexible packing cup which is mounted on the upper end of the sleeve. The sleeve is preferably produced from polychloroprene, as described in U. S. Pat. Nos. 1,950,430 and 1,967,363. A collar is threaded into the lower end of the sleeve. This collar is held stationary by a resilient member designed to frictionally engage the wall of the well while the support and the sleeve rotate, thus producing a positive longitudinal movement of the collar with relation to the sleeve and support. A housing is rotatably mounted on the collar. This housing has an open end designed to receive the open end of the neoprene cup and confine it thereto. The longitudinal movement of the collar in the sleeve serves to move the housing longitudinally with respect to the support, so as to confine and release the cup without rotating the housing about the cup.

King—U. S. Pat. 2,100,220—Nov. 23, 1937. *Refrigerator Compressor Seal.* (Assigned to General Electric Co., Schenectady, N. Y.).

A sealing device for shafts of refrigerating compressors, which will prevent the escape of refrigerating gases, consists of the compressor casing and a drive shaft which is fitted into the aperture in the casing and is provided with a transverse sealing surface. A removable L-shaped collar is mounted in the drive shaft in abutting relation with the shoulder thereof. This collar is provided with an annular recess which extends about the inner side thereof and is open to the drive shaft. A resilient annular ring is positioned in the annular recess of the collar under compression, thereby forming an effective seal for the drive shaft. This resilient ring is made preferably from polychloroprene, so compounded as to allow the ring to be subjected to an expansion of from about 8% to less than 10% by volume when saturated with a lubricating oil. The resilient annulus and the rigid ring are kept in sealing engagement with the sealing surface of the drive shaft by means of a coil spring device. The supporting collar is kept in effective sealing contact by means of an impervious resilient bellows which extends between the collar and the casing.

Weiher—U. S. Pat. 2,108,760—Feb. 15, 1938. *Refrigerator Seal.* (Assigned to General Motors Corp., Dayton, Ohio).

The compressor in a refrigerating machine includes a crank case provided with an opening in the wall and a rotating shaft which extends through the opening, forming a shoulder on the shaft. A member, having a sealing surface which surrounds the extended portion of the shaft, is urged with its sealing face against the shoulder of the shaft. Between this member and the compressor crank case there is interposed a rigid tubular element the end of which is secured to the sealing member and which extends outward therefrom. A rigid collar surrounds the extended portion of the tubular element and is slidable relative thereto. Both collar and tubular element are sealed. A nitralloy ring, which has its opposite faces ground so as to provide a smooth hard surface on one side and a smooth curved surface on the other, surrounds the reduced portion of the shaft. A resilient oil-proof, gasket-type ring is interposed between the shoulder of the shaft and the nitralloy ring. This gasket can be made from the following compound: polychloroprene (38.2%), litharge (19.1%), zinc oxide (0.8%), abietic acid (0.9%), lampblack (38.2%), refrigerator mineral oil (1.9%), and sulfur (1%). Such a gasket is resistant to the action of sulfur dioxide and other refrigerant gases.

Wells—U. S. Pat. 2,116,746—May 10, 1938. *Gasket Material.* (Assigned to Johns-Manville Corp., New York, N. Y.).

A gasket adapted to packing the spaces between two members held together by bolts is formed of a woven asbestos band which is provided with lengthwise cut-outs, thus forming slots. A wire is first disposed lengthwise over this band and over the mid-portion of the slots. The band is then folded on a line extending lengthwise of the band and across the bolts on a line underlying the wire as an axis, thereby forming a thickened band on either side of the slots. The folded portions of the band are then secured together, preferably by the application of an olefine polysulfide or a polychloroprene cement over the faces which are to be adhered together. The outer face of the asbestos gasket is also coated with this cement. The portions of the band that were originally between the ends of the adjacent slots form projections inside of which the wire extending lengthwise of the band is held securely.

Brackett—U. S. Pat. 2,134,324—Oct. 25, 1938. *Graphite Lubricated Packing.*

In the production of dry graphite lubricated fabric packing, a number of filaments of flax, asbestos, etc., are passed into a solution or dispersion of a rubber or polychloroprene, in a separate, spread-out arrangement, so as to impregnate the fiber strands with a flexible binder. After this bath, the strands are passed through a powdered mixture of graphite and an antifriction metal (preferably atomized lead), in the proportions of 1 volume of lead to 5 volumes of graphite. The lubricated strands are next passed through a perforated plate, so as to partially compact the lubricating powder on the strands. The strands are then twisted together to form a single multiple rope. The twisted strands are wound on a bobbin to form 4-layer windings in one direction and 4-layer windings in the opposite direction, and are then braided about a core in the conventional manner. The braiding is treated first with a polychloroprene cement, then with a 50:50 graphite-lead powder mixture, and the resulting material is compressed by being passed between rolls to form either square or round packings, which are then cured as desired.

Charch and Bateman—U. S. Pat. 2,159,007—May 23, 1939. *Moisture-Proof Articles.* (Assigned to E. I. du Pont de Nemours & Co., Wilmington, Del.).

In the production of transparent and moisture-proof wrapping tissues, a cellulosic base, such as regenerated cellulose, cellulose esters or ethers, paper, etc., is coated with a primer from a phenol-aldehyde, urea-aldehyde or alkyd resin and then treated with a moisture-proof coating from a nitrocellulose, Pliolite, hydrogenated rubber, chlorinated rubber, thermoprene, polychloroprene, etc. The resin anchoring coating may, however, be incorporated in the film base to be moisture-proofed by

forming an aqueous dispersion of the resin and the cellulose derivative, and filming the mixture into a pellicle. In one example, a regenerated cellulose film is treated with an aqueous solution of glycerine, resorcinol, formaldehyde and sodium hydroxide and the sheet then treated to form the resin and dry the coating; or the cellulose sheet may be coated with a partly condensed resin applied in the form of an alcohol solution, aqueous dispersion or hot melt. In another example, a resin is formed by condensing one mole of dihydroxydiphenyl propane dissolved in aqueous sodium hydroxide containing two moles of sodium hydrate and 3.25 moles of 37% formaldehyde, allowing the mixture to condense at room temperature for two days. The resulting viscous solution is precipitated with an acid, separated and dissolved in sodium hydroxide to form a 15 to 20% solution, a viscose solution containing 7.5% added, and the mixture filmed. Whichever way the phenolic, urea or glyptal resin is incorporated in the cellulosic sheet, the moisture-proof nitrocellulose, polychloroprene, cyclized rubber, hydrogenated rubber, etc., containing a wax is applied and strongly adhered to the treated sheet.

Graves--U. S. Pat. 2,238,694—Apr. 15, 1941. *Coated Nylon Filaments.* (Assigned to E. I. du Pont de Nemours & Co., Wilmington, Del.).

Fibers from condensates, amino acids, or diamines with dibasic carboxylic acids (as described in U. S. Patents 2,071,253 and 2,130,943), or linear polymers of ethylene (as disclosed in U. S. Patent 2,153,553) are given curled effects, or cracked and roughened surfaces by coating the fiber with an elastic or inelastic coating and then cold drawing the fibers. Thus, when a smooth filament of polyhexamethylene adipamide or polyethylene is coated with an elastic film coating from natural rubber, polychloroprene, polybutadiene, etc., and then stretched by cold drawing, the filament will be curled or coiled, due to the contraction of the rubbery casing film. But if the coating is of a resinous nature—from cellulose esters, polyacetals, polyacrylate, or polyvinyl resins, phenolaldehyde resins, alkyd resins, etc.—then when the coated filament is cold drawn, there is obtained a synthetic linear polymer having a cracked or roughened surface, due to the inelasticity of the coating. In the case of elastic coatings, a thread from polyhexamethylene adipamide is coated with natural rubber (preferably from vulcanized latex) or with a solution or dispersion of a polychloroprene, polybutadiene, etc., and dried. The coated filament is thus cold drawn about 300%. When the stretching force is released, the rubbery coating retracts, thereby imparting a distinct curl or crinkle effect to the filament. When spun into yarns, the synthetic fiber has a woolly appearance.

Basler—U. S. Pat. 2,257,932—Oct. 7, 1941. *Washing Machine Agitator.*

In a washing machine of the type having an upright agitator of aluminum or other metals, the vanes of the agitator connected to the base and post of the washing machine are treated with a coating material, thus reducing the wear on clothes during the washing operation. In order to effect a better bond between the aluminum and the coating material, the surfaces of the junction of the vanes with the base and post are made concave and are formed by radii of at least 5/8ths of an inch in length. A coating of rubber, from natural latex or from a polychloroprene, polybutadiene, etc., is applied to the agitator by a process involving coagulant and spraying or dipping in the latex, as described in U. S. Patent 1,959,201 and Reissue Patent 19,155. To prevent any possibility of the washing fluid working in between the rubber coating and the base at the edge of the coating, a washer or a ring is set to the metal base covering the edge of the rubber coating. The coating is then vulcanized by heat. The vanes of the agitator may also be provided with perforations of sufficient size to permit the washing fluid to pass through. These perforations also effect a better bonding of the rubber to the metal since the coating will also cover the perforations of the vanes.

Kistler—U. S. Pat. 2,259,524—Oct. 21, 1941. *Molding Polymeric Products.* (Assigned to E. I. du Pont de Nemours & Co., Wilmington, Del.).

In a method of producing molded articles from polymers of vinyl compounds, chloroprene, etc., the monomers are placed in a mold surfaced with silver which will prevent discoloration of the polymer to be produced and also effect the production of a polymer which will not stick to the mold and will not inhibit polymerization. In an example for making a lens blank or a window glass material, an 80:20 mixture of methyl methacrylate and methacrylic acid is placed within a mold formed of silver-lined brass plates and this mold is then sealed entirely by means of a flexible Thiokol or polyvinyl alcohol gasket held in place by clamps. The mold is then immersed in a water or oil bath held below the boiling point of the mixture —about 50° C. in this case. Polymerization is effected in 4 to 5 hours. The smooth molded polymer thus obtained is removed from the mold and subjected to further heating at 100 to 150° C., which is below the softening point of the formed polymer.

Thomas and Sparks—U. S. Pat. 2,311,004—Feb. 16, 1943. *Corrosion-proof Containers.* (Assigned to Jasco, Inc., New York, N. Y.).

This is a variation of U. S. Pat. 2,311,308 for producing metal containers which are rust proof, using the same type of butadiene-monolefine liner and the same method for applying the liner to the container. The liner material consists of 30 to 0.5% diolefine and 70 to 99.5% monolefine, polymerized at temperatures below —10° C. The liner material is from a composition containing the following parts: Polymer (100), carbon black (10), zinc oxide (5), Tuads (1), sulfur (1.5), and stearic acid (3). This composition may be laminated with the metal container by sheeting or extruding the plastic mass and adhering it to the interior of the container by means of a sulfonated cyclized rubber. The copolymer is preferably from a mixture of isobutylene and isoprene, pentadiene, or dimethyl butadiene, polymerized into a polymer having a molecular weight between 15,000 and 500,000, an iodine number between 1 and 60, and a tensile strength of 1,000 to 4,500 lbs./sq. in. Such a container may be used for storing caustic liquors, hydrogen chloride, acetic acid, or as a casing for storage batteries, etc.

Kelso and Mixon—U. S. Pat. 2,316,085—Apr. 6, 1943. *Lubricating Material.* (Assigned to Standard Oil Co., Chicago, Ill.).

An oil for lubricating engines of the spark-ignition and compression-ignition types comprises a paraffinic or naphthenic oil treated with 0.01 to 20% of a compound which will enhance the viscosity index of the oil and prevent carbon deposits in the engine. Such compounds include the reaction product of phosphorus pentoxide with hydrogenated natural rubber, hydrogenated polybutadiene, polyisoprene, polychloroprene, polyisobutylene, octa decyl alpha methacrylate polymer, polystyrene, etc. The amount of phosphorus pentasulfide may be from 1 to 50% and preferably 5 to 25% of the weight of the polymer. The reaction can be carried at 200° to 500° F. and preferably from about 300° to 400° F. Thus, a hydrogenated rubber, or a polybutadiene, polychloroprene, etc., is admixed with 10% or more of phosphorus pentasulfide and the mixture heated at 380° F. for about 6 hours in an atmosphere of an inert gas, such as nitrogen. When 0.1 to 2% of the reaction product is added to an SAE 20 lubricating oil, the viscosity-temperature coefficient of the oil is improved and formation of varnish-like or carbon deposits in the engine during operation is inhibited.

Anderson—U. S. Pat. 2,316,089—April 6, 1943. *Lubricating Oils.* (Assigned to Standard Oil Co., Chicago, Ill.).

The viscosity index of paraffinic or naphthenic lubricating oils is improved by incorporating therein from 0.1 to 20% of a modifier resulting from the reaction of a sulfide of phosphorus with a copolymer of butadiene, isoprene, cyclopentadiene, dimethyl butadiene, pentadiene 1, 3, hexadiene 2, 4,

chloroprene, diisobutenyl, vinyl acetylene, etc., with isobutylene, 2-methyl-butane-1, 2-ethyl-butane, etc. These interpolymers should have a molecular weight from about 1,000 to 30,000 and preferably 2,000 to 20,000 and should contain from 2 to 20% or more of the butadiene or substituted butadiene. Thus, a mixture of 40 parts of butadiene with 60 parts of isobutylene in liquefied propane is cooled to about —80° F. by partial evaporation of the propane, and an 0.5% solution of aluminum chloride in methyl-chloride, previously cooled to —80° F., added slowly, and the mixture allowed to react until 50 to 80% polymerization is effected. The polymer thus obtained is mixed with about 10% of phosphorus pentasulfide and heated at 380° F. for about 5 hours in an atmosphere of nitrogen. The reaction product is diluted with hexane and filtered. It may then be treated with 0.5% of dry potassium hydroxide, first at 200° F. and then at 340 to 350° F., for 5 hours. This interpolymer is added in a small quantity to a lubricating oil to enhance the viscosity index of the oil.

Dennstedt—U. S. Pat. 2,323,313—July 6, 1943. *Stable Butadiene Interpolymers.* (Assigned to Jasco, Inc., New York, N. Y.).

The latex obtained from the interpolymerization of butadiene, isoprene, dimethyl butadiene, etc., with styrene, acrylic nitrile, vinyl methyl ketone, etc., is stabilized by incorporating in the latex, as soon as it has been formed, an anti-oxidant, e.g., phenyl beta naphthylamine, dibenzyl naphthylamine, or alkyl phenyl disulfide, together with a small quantity of a stabilizer from the class consisting of alkali metal hydrosulfite, hydroquinone, hydrogen sulfide, and alkali metal salts thereof, ferrous and alkali metal salts of formaldehyde sulfoxylate condensate, in such an amount that they will be present in the latex after effecting the decomposition of peroxide, as disclosed in U. S. Pat. 1,860,681. In one example, a 75:25 butadiene-acrylic nitrile interpolymer, in the form of a latex to which there has been added 3% of phenyl beta naphthylamine, is stabilized by incorporating about 1% of hydroquinone, or 1.5% of hydrogen sulfide, or 1.2% of ferrous sulfate, or 1% of sodium hydrosulfite. A latex from a 75:25 butadiene-styrene interpolymer is rendered stable by incorporating 3% of phenyl beta naphthylamine and 1% of linoleic acid.

Klenle and Peiker—U. S. Pat. 2,323,871—July 6, 1943. *Printed Fabrics.* (Assigned to American Cyanamid Co., New York, N. Y.).

Printed fabrics are produced by a special rubbery or resinous emulsion of the water-in-oil type. The rubbery material may be polychloroprene or natural rubber, while suitable resinous substances are alkyd resins, cellulose derivatives, chlorinated rubber, etc. The special colored printing emulsion is made by dissolving the film-forming material in a solvent, adding the required color (such as ultramarine, phthalocyamine pigments, phosphotungstic and phosphomolybdic lakes of basic dyes, etc.) and then emulsifying the colored solution in water, with or without the aid of an emulsifying agent. When the film-forming material is polychloroprene, 33 parts of a suitable polymer of chloroprene are dissolved in 157 parts of toluene and an aqueous dispersion consisting of 12 parts of copper phthalocyamine, 12 parts of diethanolamine oleate, and 94 parts of water rapidly agitated therein, thus forming a finely-divided water-in-oil emulsion. When 150 parts of this emulsion are diluted with 75 parts of toluene, there is obtained a pourable blue dispersion in which water is dispersed in the form of particles of 5 micron average size. Such a colored dispersion is applied to print a cotton fabric or other fabrics by means of an engraved copper roll. The printed fabric is then dried at about 50° C. for 30 minutes and then heat treated at 120° C. for 5 minutes to obtain a print resistant to wet and dry cracking and to washing.

Status of Latex Foam Products for Civilian Markets

WARTIME research and rapid progress in the use of synthetic rubber latex are speeding the return of latex foam products to civilian markets, according to a recent survey conducted by the Rubber Manufacturers Association. Natural rubber latex was the basic material for the new cushioning products introduced in the pre-war decade. Supplies were choked off when the Japs swept into Malaya and the Netherlands Indies in 1941. Resumption of natural rubber latex shipments from the Far East is not expected in the immediate future. Meantime, the past year has seen manufacturers making rapid progress in adapting synthetic latex to new uses. Improvements in recent months have been such that latex foam made from synthetic rubber can step in to meet most of the backed up civilian demands as soon as restrictions are lifted.

Latex foam was developed in 1931. Hailed as a revolutionary new cushioning and mattress material, it had become popular and had been convincingly tested and used by the public before the war. It went to war on Pearl Harbor day. From that day to this, both natural and synthetic latex foam products have seen continuous war service, on land, on sea and in the air. As crash padding, it saved hundreds of General Patton's rough-riding tank corpsmen from serious injury as they bounced around in Shermans and Pershings. Army medics have used it for hospital mattresses and stretcher pads and to equalize pressure under cumbersome casts and splints.

In the air, latex foam is serving as shock absorbers for delicate flight instruments, on oxygen masks and earphone pads, and to seal bomb bay doors on such aerial giants as the B-29, where it is also employed as cushioning material to combat crew fatigue on long hauls to Tokio. The Air Corps also uses it for parachute seats and backs and gunners' pads. At sea and in landing operations, it seals amphibious tanks, serves as submarine mattresses and pillows, pads deck helmets and soaks up battle shock on gun control apparatus and mines.

Latex foam made its transportation debut in 1935 when it went into the first streamlined train. It has been specified for mattresses and cushioning in every Pullman built since that time. By 1938 it had spread rapidly to inter-city buses, commercial airliners and to steamships, and in the same year it was introduced to civilians in the deluxe mattress line. It gained quick acceptance in the auto industry. Just before the war it was offered as standard equipment cushioning for a number of top lines in the upper price bracket and as optional equipment in intermediate lines. The automobile manufacturers are today planning its use in the car of tomorrow.

Widespread use in the field of upholstered furniture and mattresses is also forecast. While use in mattresses, public and private transportation, hospitals and public buildings, and as cushioning materials in the furniture industry will represent the greatest proportion of the market, latex foam had found many other applications before the war.

Editorials . . . . . .

Goodyear Strike

NOW that the Navy has taken over operation of the Goodyear plants at Akron, an action heartily approved by the strikers who staged a 20-day walk-out, there is considerable doubt as to what these workers actually gained by the walk-out. According to the best reports available, the strike was called because of the inability of the Goodyear management and the union to amicably settle some 32 grievances, wage rates being the principal bone of contention. Once the strike was called, these grievances were laid in the lap of the War Labor Board, but seizure of the plant by the Navy has not resulted in any burst of activity on the part of the Board to settle any of these grievances, nor is the management obliged to accept any such settlements once productive efficiency in the plants is restored and the plants are returned to Goodyear for operation.

In many quarters the charge is made that the strike at Goodyear, and that currently being conducted against Firestone, was more the result of dissension within union ranks than grievances with management. International officers of the United Rubber Workers of America have long upheld the union's no-strike pledge and pleaded with the Goodyear strikers on several occasions to return to work and allow the War Labor Board to settle the existing differences. Heads of the Goodyear and Firestone locals were among the leaders of a determined group which attempted to unseat the incumbent heads of the International Union at the last U.R.W.A. convention held in New York City and to have the no-strike pledge withdrawn. They were defeated by a slight majority only. In any event, whatever the cause of the current wave of strikes in the Akron area, and no matter whether the workers or management come out the victors, the war effort is definitely the loser.

Opposition to Guayule

STRONG opposition to the proposed expansion of the guayule rubber production program in the United States has been voiced by P. W. Litchfield, chairman of the board of the Goodyear Tire & Rubber Co. Mr. Litchfield's outspoken criticism of the program brought to light the curious fact that William O'Neil, head of the General Tire & Rubber Co., and one of the foremost proponents of guayule rubber, is not supporting the present expansion program either. Although the latter has not issued any statement condemning or criticizing the planned expansion, his lack of active support may be interpreted as a lack of faith in the success of the program.

Mr. Litchfield's major objection to the pending legislation, which would boost guayule production to some 400,000 acres, the output of which would be guaranteed a price of 28c per pound, is based on the fact that the projected yield would develop at a time when a huge surplus of both Hevea and synthetic rubber would be available. Since the price of Hevea and synthetic rubber would be somewhere between 12 and 15c a pound guayule rubber would be at a distinct price disadvantage and the chances are that a good portion of the available supply would be forced to remain in warehouses. As Mr. Litchfield points out, however, we should continue to explore the potentialities of guayule rubber, but this can be accomplished on a far smaller scale than that proposed by Congress.

Rubber Report

THE latest report issued by the Rubber Reserve Co., which traces the activities of that organization in the procurement of natural and synthetic rubber since its inception, is a comprehensive one, and is "must" reading for every member of the rubber industry. Although it includes statistical information already largely known to the rubber industry in general, it gives an excellent indication of the current status of raw material supplies and numerous conclusions may be drawn from it as to the future status of the giant synthetic rubber industry. In the latter instance, the report firmly points out that synthetic rubber in the postwar period can and will undoubtedly be made to sell at between 11 and 12c a pound.

It is apparent from the report that synthetic rubber will be part of the American industrial picture for all time. The real problem to be faced is that of transferring the government-financed plants to self-sustaining private ownership. The transfer is necessary not only because the United States is committed to free enterprise, but because the government agencies lack the technical knowledge to make and continue to improve synthetic rubber. It is a foregone conclusion, then, that some day these synthetic rubber plants will be turned over to private industry. How, remains the problem.

SOME SYNTHETIC IN ALL TYPES OF TIRES DECREED IN LATEST CONSERVATION MOVE

THAT the dwindling stockpile of natural rubber is still a critical problem, despite growing promises of early shipment of such rubber from reconquered areas in the Far East, especially from Borneo, was indicated early this month when the War Production Board decreed that no more tires will be manufactured entirely of natural rubber. This latest conservation step, which is expected to save 1,300 long tons of natural rubber a year, is covered by Amendment No. 1 to Appendix II of Rubber Order R-1, effective July 5. This appendix gives the construction authorized for all tires, except airplane and bicycle tires. The amendment affects certain sizes of truck, bus and implement tires, and bogie, idler and support-roller tires for tanks and half-tracks.

Under the amendment all pneumatic tires now fall into one of the following classifications, arranged in order of percentage of synthetic rubber:

Construction	*Synthetic Rubber*	*Natural Rubber*
S-3	100%	——
S-4	90%	10%
S-5	35%	65%
S-6	70%	30%
S-7	35%	65%
S-8	93%	7%
S-9	80%	20%
S-10	50%	50%
S-11	5%	95%

The figure for the S-3 construction is complete with the exception of cement, while the figures for the S-5 and S-11 types are approximate. The S-5 type comprises a synthetic tread on a natural rubber carcass, S-7 is similar to S-5 except that the various types of rubber may be used as desired, while S-11 has synthetic sidewalls.

Other Revisions Made

Although the natural rubber position continues critical, the synthetic rubber picture continues to grow brighter. The increased use of GR-I (Butyl) for inner tubes has been authorized by the issuance of Amendment No. 2 to Appendix II of the Rubber Order. This amendment permits the use of Butyl in inner tubes for all pneumatic industrial equipment and tractors and implements except in the small sizes, 5.50-16, 6.00-16 and 6.50-16. Tests have definitely indicated that Butyl is a most satisfactory rubber for inner tubes and, according to WPB, its use will be extended further whenever the supply permits.

Prior to the issuance of the appendix amendments listed above, WPB announced on July 4 that aqueous dispersions of reclaimed rubber are no longer under allocation. This action, taken because such dispersions are now in more plentiful supply, was covered in Amendment No. 1 to Rubber Order R-1, as Amended May 30, 1945. Reclaim dispersions may now be used for any purpose permitted by Appendix I of the Rubber Order.

At the same time WPB issued Amendment No. 1 to Appendix I of the Rubber Order, correcting various technical and typographical errors which appeared in the printed order as amended May 30. None of the corrections substantially affect rubber manufacturers.

New Tire Production Schedule

A revised tire production schedule for the third quarter of the current year was released by W. James Sears, Deputy Director of the WPB Rubber Bureau, on June 15. The new schedule reflects a sharp drop in requirements for airplane and the A-1 class of special miiltary combat tires during the redeployment period of the war and production of such tires is expected to meet requirements. Production of some other groups of tires in the larger truck and bus tire sizes is expected to continue to lag behind screened requirements.

In the A-3-b group (large sizes, 19.00 to 11.00), planned production, which is equivalent to the maximum estimated production of the industry, is 25.2% under screened requirements. This was said to be due to a shortage of trained manpower and the fact that new facilities for this group now under construction are not yet completed.

Production of all tires for the third quarter of the year is now scheduled as follows, the figures in parentheses indicating production for the second quarter as scheduled last April: Airplane—172,-143 (337,955); A-1—3,000 (51,167); A-2—13,603 (14,000); A-3-a—178,137 (136,-288); A-3-b—1,098,212, (1,086,011); A-4—1,041,155 (905,487); A-5—2,172,873 (2,425,633); A-6—700,000 (1,156,721); passenger car and motorcycle—6,000,000 (5,200,000); tractor-implement (over 7.50)—244,944 (150,227); tractor-implement (7.50 and under)—435,100 (300,-000). The production of camelback is scheduled for 90,000,000 pounds as it was in the second quarter.

From the standpoint of screened requirements in the third quarter based on a one-front war, scheduled production of airplane, A-1 and tractor-implement tires meet requirements. Scheduled production of A-2 units is 8.7% less than screened requirements, A-3-a, 13.2%, A-3-b, 25.2% and A-4, 12.4% less. Scheduled production of A-5 units, however, is 5.1% above screened requirements and A-6 units, 75% above such requirements. There are no screened requirements in the passenger car and motorcycle tire constructions since production of such units is scheduled on the basis of supply of tire component materials, manpower and the relative importance of essential needs.

According to Mr. Sears, because tire building facilities were not fully manned in the second quarter of the year the schedule for that quarter will probably not be met. In conection with the schedule for the third quarter of the year, he stated that the saving in manpower and component materials, which normally would be put behind the production of the A-1 (special combat) constructions, will be devoted to production of the critically needed large truck tire groups, chiefly in the A-3-b classification. Increased production in the A-3-a group is possible because expansion projects, begun more than a year ago to increase facilities, now are in production.

Advisory Committee Meets

A meeting of the recently organized Rubber Industry Advisory Committee, the membership of which was detailed in our last issue, was held in Washington on June 29, at which time the members were told that total tire requirements expressed in tonnage for the one-front war are as high as they were last November when the war in Europe still was being fought. Since military requirements for the third quarter, as determined last month, are approximately equal in tonnage to the requirements presented last November for the same quarter, such reductions as have been made only reduce increases made in the requirements in the last six months.

The Committee was told that military needs of rubber footwear would be much heavier in the second half of the year than they have been in the first half and that unless output was substantially increased the civilian supply would be very short next winter. The problem is one of obtaining more labor and materials, particularly fabrics, and it was predicted that men's four and five-buckle arctics and men's and women's rubbers will be very hard to obtain. Little hope was

held out for tennis and basketball players and other users of canvas rubber-soled shoes. It was reported that fewer than 2,000,000 pairs of a scheduled 15,000,000 pairs were made in the first five months of the year.

The Committee was also told by John L. Collyer, Special Director of Rubber Programs, that employment in the tire industry, and in most industries that supply components, was at the highest level of the year but because of work stoppages the increase in manpower has failed to result in increased tire production. While estimates of component supplies indicate improvement in some critical categories, it was emphasized that in the main a higher production rate was called for than is now being achieved.

In the case of rayon tire cord, projected schedules indicate that the material will be relatively tight in the second quarter of next year. Future schedules of carbon black, if they are met, will supply surpluses after the third quarter of this year. Nylon tire cord similarly show surpluses, according to the statistics, reflecting in this case cutbacks in the airplane tire program starting in October. There is sufficient production capacity for cotton tire cord, providing sufficient manpower is found so that facilities may be operated at full production. Bead wire was said to show an adequate supply for each quarter.

EDITOR'S NOTE: It is reported in reliable quarters that Mr. Collyer has accomplished his job with WPB as Special Director of Rubber Programs and is planning an early return to his post as president of the B. F. Goodrich Co. Up until the Goodyear strike, it was understood that Robert S. Wilson, vice-president in charge of sales for Goodyear, was slated to succeed Mr. Collyer.)

In anticipation of continued high military requirements for rubber in the third quarter of the year, WPB requested the War Manpower Commisison on June 24 to place inter-regional recruitment facilities at the disposal of companies engaged in the production of rubber tires and rubber products in general. The request for such inter-regional recruitment was based on the result of recent surveys which indicated that laid-off workers have not readily accepted work at lower wage scales. Since the rubber industry pays a relatively high rate, it is believed that such recruitment would bring many non-rubber workers into the rubber field.

Revise Accelerator Requirements

It was revealed on June 28 that a survey of the supply and requirements of rubber accelerators and antioxidants has indicated that over-all requirements for these chemicals are lower than the estimates which were presented to members of the Rubber Accelerator and Antioxidant Industry Advisory Committee last month. In response to last month's request for new facilities for these chemicals several proposed projects were submitted to WPB. However, it was stated, until an additional survey currently being conducted by the rubber industry is completed, these projects will be held in abeyance.

The guanidines are the only accelerators in critically short supply. Action has been taken to expand the present facilities for the production of guanidines, and an increased output is expected within 60 days. Other accelerators, classed as "borderline cases," which might become scarce, are aromatic and aliphatic thiazoles and dithiocarbamates.

In the antioxidant group, there is a shortage of secondary mono-amine type and diphenyl-p-phenylene diamine. WPB said that the necessary increase in production can be achieved by the expansion of existing facilities rather than by the construction of new plants.

Dimethyl amine, a raw material used in the production of accelerators, is in short supply, but a new plant which is expected to start production in the near future will relieve the situation. Expansion of facilities for the production of methyl ethyl ketone, used to make intermediates for certain types of aliphatic thiazoles, is now under consideration.

Beta naphthol is in short supply, because of steadily increasing requirements for the accelerator for the synthetic rubber program and because of a shortage of naphthalene. Peroxides and cyanides continue to be critical, with no apparent relief in sight.

Rubber Reserve Issues Report

With the release of a study entitled "Report on the Rubber Program: 1940-1945," which reviews the over-all program of the Rubber Reserve Co. in both the synthetic and natural rubber industries, it was revealed that production of American synthetic rubber since the start of the Government rubber program now totals approximately 1,400,000 long tons. Although statistics presented in the report cover the activities of Rubber Reserve up to the beginning of 1945 only, S. T. Crossland, executive vice-president of Rubber Reserve, disclosed that 378,000 tons of synthetic rubber were produced in the first five months of the current year and that estimated production of 78,000 tons for June will make a total for the first half of the year about 456,000 tons. Scheduled production for the entire year is approximately 1,000,000 tons.

Although production costs are showing a uniform downward trend and eventual costs are expected to be competitive with pre-war prices of natural rubber, "operating losses of a sbstantial character are being incurred by Rubber Reserve Co. as a result of ceiling prices established by the OPA," the report says.

The present average cost of producing GR-S is given by the report as from 30c to 31c a pound. That cost is the average for all plants in the program, exclusive of sales and administrative expense, interest charges and plant amortization. However, costs in the range from 11c to 12c a pound are obtained in one plant supplied exclusively with butadiene and styrene from petroleum feedstocks.

Postwar cost estimates of approximately 10c per pound for GR-S made from butadiene from petroleum feedstocks and from 11c to 14c per pound for the same material utilizing butadiene produced from industrial alcohol are given in the report. These production costs are based on an assumption that butylene can be purchased by the synthetic plants for from 6c to 8c per gallon and that postwar industrial alcohol prices will be in the range of from 15c to 25c per gallon.

Production rates of approximately 180 per cent of rated capacities have been attained by the alcohol butadiene plants, the report says. As a result, their operating costs, exclusive of feedstock, have been stabilized at the comparatively low level of 2.2c to 2.5c per pound. Yields of from 2.35 to 2.40 pounds butadiene per gallon of 190 proof alcohol are being obtained. Equipment is being installed to increase the yield to 2.50 pounds per gallon. Research projects under way may ultimately increase the yield to 2.75 pounds per gallon. The 1945 synthetic rubber program requirements of industrial alcohol are placed at 354,000,000 gallons.

Neoprene, the report reveals, is now being produced at a cost of from 23c to 24c per pound based on a cost of from 11.5c to 12c a pound for acetylene, the principal element in the over-all cost. Based on an estimated postwar acetylene price of 6c to 7c per pound, the probable production cost of neoprene is placed at 19c per pound.

Manufacturing costs for Butyl were approximately 13c to 18c a pound during the fourth quarter of last year when plants attained operating rates of from 50 to 80 per cent of capacity. Major operating difficulties have been encountered in the production of Butyl, but higher production rates and lower costs are expected this year.

Concerning the future of the rubber program, the report states that requirements for synthetic rubber from Government plants aggregate approximately 985,000 tons for 1945 and 1,176,000 tons for 1946, which is approximately 120% of rated capacity in 1945 and 140% of rated capacity in 1946. These requirements are attributable to the expanded tire program and are essential to its successful completion.

To meet these requirements, the report points out, it will be necessary not only that the present facilities be operated at a level far in excess of that heretofore achieved but also that certain modifications and additions be made to existing facilities at an investment cost of approximately 3% of the present investment. Furthermore, it will also be necessary to obtain the required chemicals, alcohol and petroleum feedstocks. Unless the program can retain the technical and skilled personnel it now has and also obtain such additional personnel as is necessary for the operation of

EVEN THOUGH THE CARBON BLACK SUPPLY SITUATION IS CRITICAL . . .

RESEARCH CARRIES ON

In our laboratories investigation of the properties of colloidal carbon in relation to its use in rubber compounding goes on apace.

When war-time restrictions are lifted the results of this research will be available for improvement of the goods of peace-time commerce.

MICRONEX — For 30 years the Standard Reinforcing Carbon

STATEX — The black for dynamic reinforcement in GR-S

FURNEX — The High Resilience Carbon

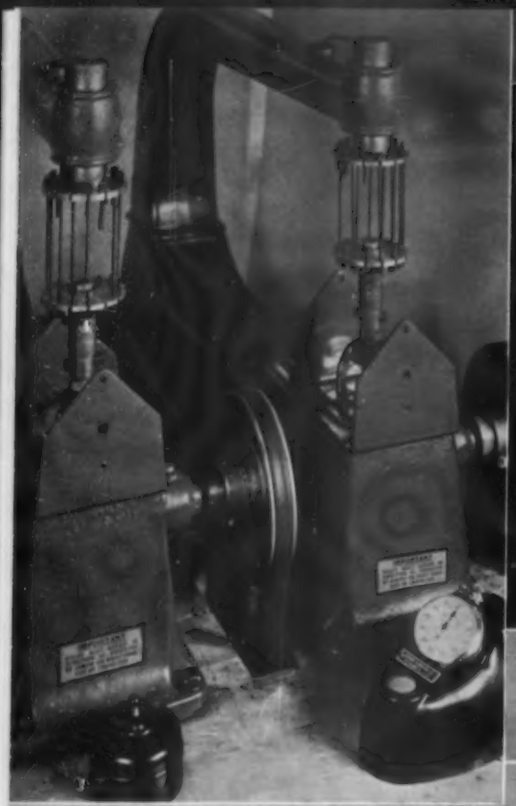
• COLUMBIAN COLLOIDS •

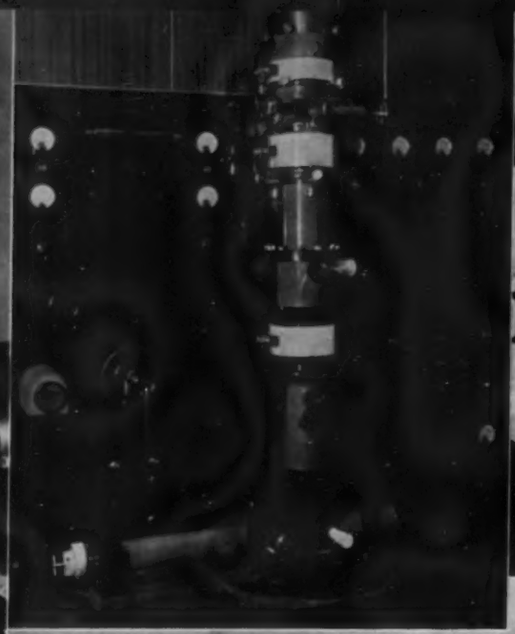
COLUMBIAN CARBON COMPANY

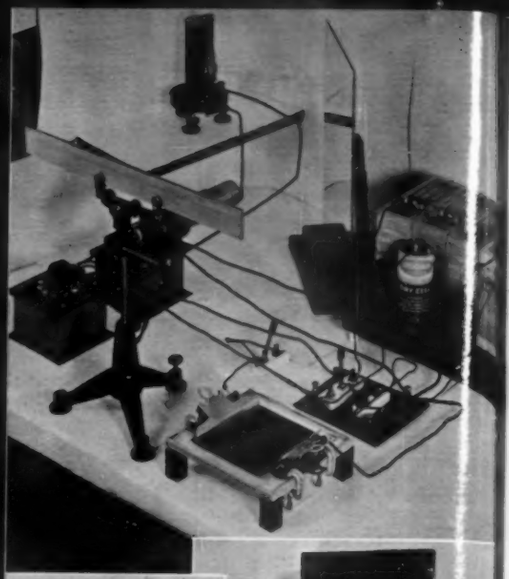
400 TONS OF SMOKE A DAY

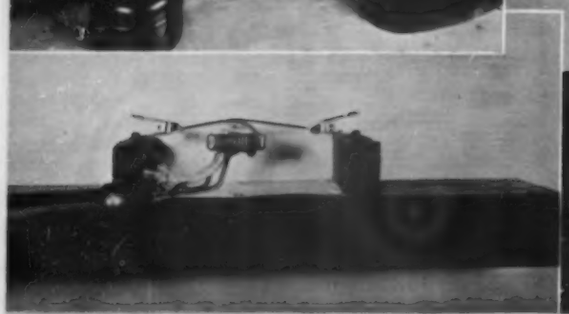
COLUMBIAN CARBON CO. • BINNEY & SMITH CO.

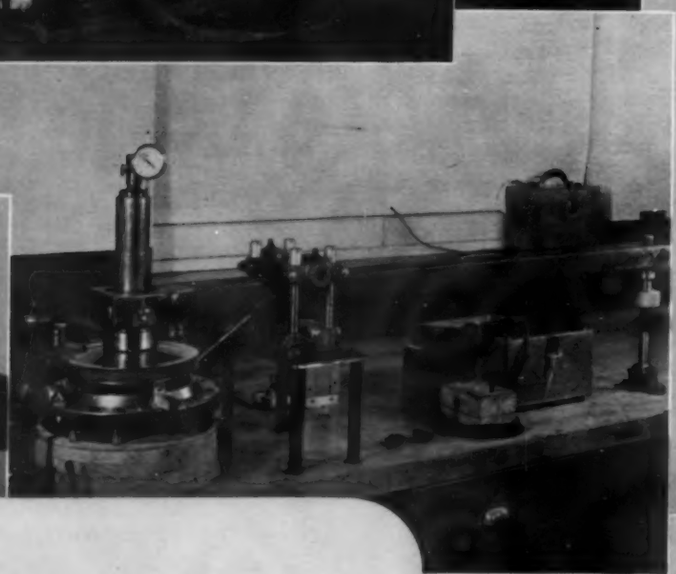
MANUFACTURER DISTRIBUTOR

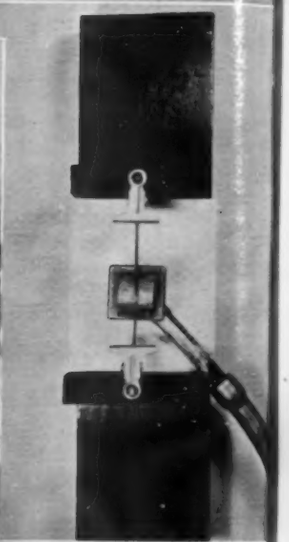








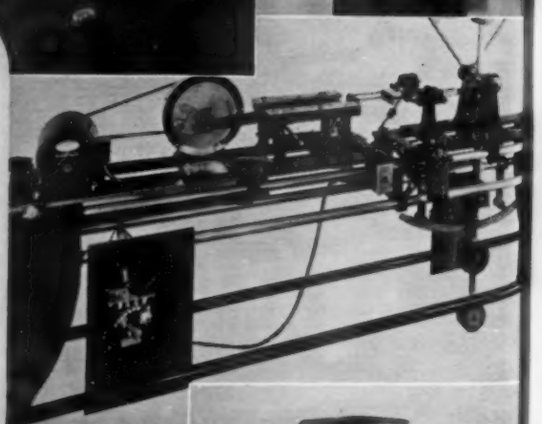


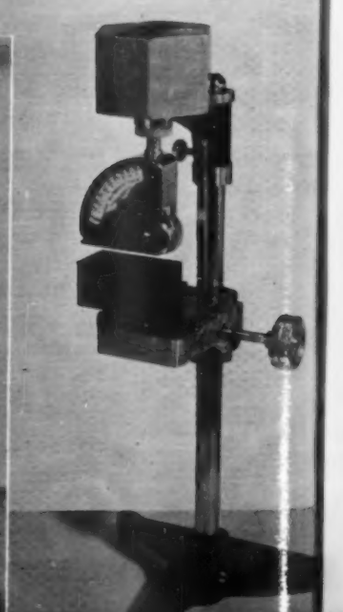


Our Research employs unique and specialized equipment. Apparatus has been originated by the laboratory staff and many refinements have been added to conventional rubber testing machinery.

COLUMBIAN CARBON CO. • BINNEY & SMITH CO.

MANUFACTURER DISTRIBUTOR





the plants, it will be impossible to produce the amount of rubber required.

The report concludes with the statement that pending the liberation of the occupied rubber-producing areas and during the time required to bring the plantations up to a substantial percentage of their former capacity, it will be necessary for the government's synthetic rubber plants to operate at a high rate of capacity.

Report on German Buna

The war-born American synthetic rubber industry has developed better rubber than Germany ever did, according to a report made to the War Production Board and the Rubber Reserve Co. by a technical mission that went to Europe to study rubber developments. The mission was headed by Russell Hopkinson, director of commercial development of the U. S. Rubber Co., and included J. D. Fennebresque (Celanese Corp.), B. S. Garvey (Goodrich), E. T. Handley (Firestone), R. D. Juve (Goodyear), J. W. Livingston (Rubber Reserve), Dr. Carl L. Monrad (Carnegie Institute), A. H. Nellen (Lee Tire), R. D. Schatzel (General Cable), J. E. Troyan (Phillips Petroleum), and W. L. White (Manhattan Rubber).

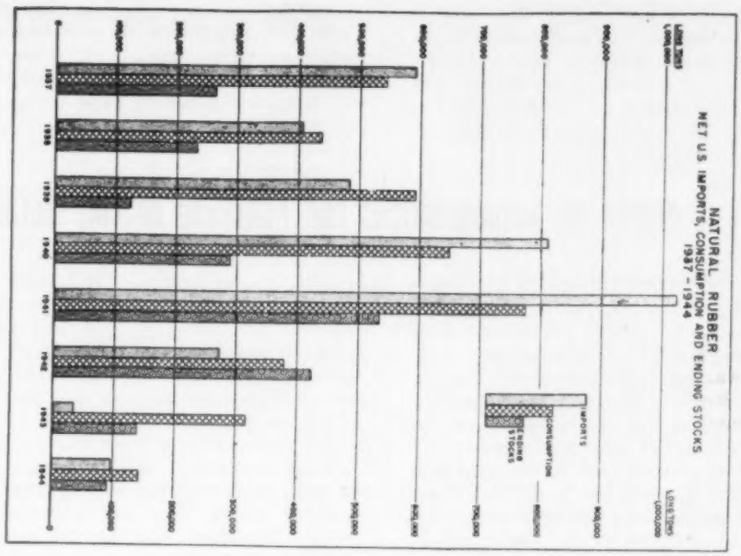
In a joint statement issued on June 21, WPB and Rubber Reserve said that the committee's report indicated that the United States and its allies could not have produced tires, tubes and other rubber products in sufficient volume and of adequate quality to maintain their armed forces and a civilian economy if they had to rely on the type of synthetic rubber used by the Germans. Although the total rated capacity of the German synthetic rubber industry was 170,000 tons a year, actual production never exceeded 110,000 tons a year.

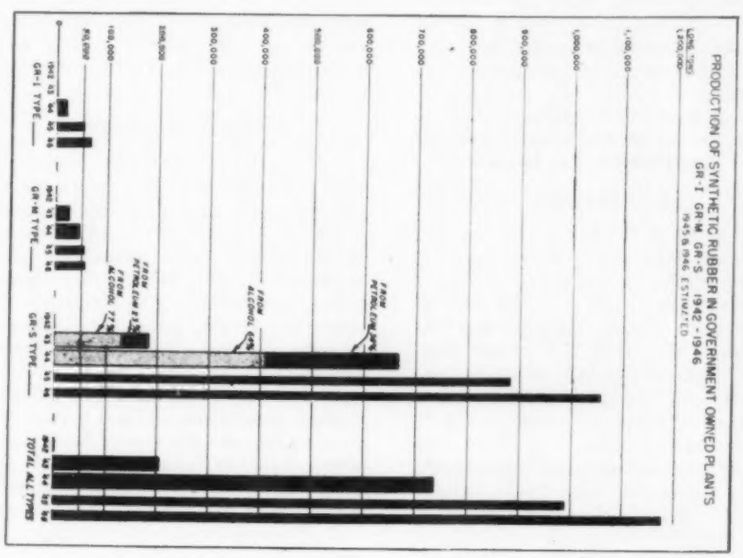
Since liberation, the report stated, French manufacturers of rubber products have used GR-S. Using German synthetic rubber, the French found that fabricating capacity was reduced 50% for end-products, because the German synthetic has to be heat softened before compounding, and its utilization is more difficult. The sole producer of the German synthetic was I. G. Farbenindustrie.

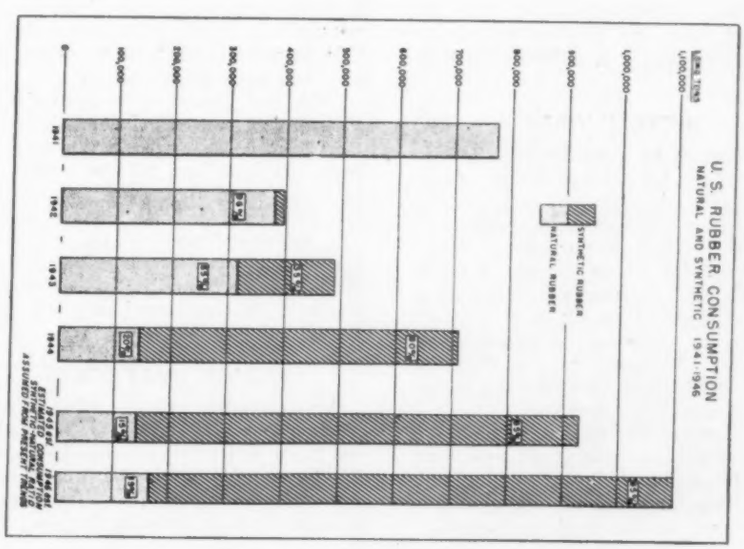
The report also pointed out that whereas the synthetic rubber program in the United States includes the manufacture of neoprene and Butyl in addition to GR-S and GR-A, the only types manufactured in Germany were Buna S and Buna N. Tires made in Germany will be tested in this country in direct comparison with American synthetic tires, although it is already known that the German tires are subject to failure at high speeds or under heavy loads due to excessive heat generation.

Despite rigorous industrial and military manpower requirements in Germany, the synthetic rubber plants were found to be staffed fully with highly trained technical personnel. A complete set of replacement parts for machinery

STATISTICS FROM THE LATEST REPORT OF THE RUBBER RESERVE COMPANY







and equipment was held in reserve at a central location for immediate emergency shipment. Members of the American technical mission were fortunate in locating Germany's key technical personnel and by questioning them and by painstaking surveys of their remaining plant facilities, details of processes and techniques were obtained. It is not believed, however, that this information will be of any pertinent value to American technologists.

LIMIT IS PLACED ON AUTHORIZATIONS FOR PURCHASE OF TIRE MOLDS

Under the terms of General Limitation Order L-143-a, as Amended July 5, 1945, a 45-day limit is placed on authorizations for the purchase of tire molds. This move was necessary, according to the WPB Rubber Bureau, because some manufacturers obtained priorities ratings and then failed to place the orders. Hereafter, they must return authorizations to the Rubber Bureau for cancellation if the ratings are not used within 45 days.

Another change in the order, which covers methods of requesting authority to purchase rubber processing machinery and equipment, provides that the "frozen schedule" procedure of WPB Order M-293, as Amended July 5, 1945, will govern orders for such machinery and equipment.

Other government regulations affecting the rubber manufacturing industry issued in recent weeks include the following:

STRIP RUBBER

In a move to curb excessive prices being charged by new resellers entering the field, dollar-and-cent ceilings have been established by OPA on all sales of strip rubber. The ceilings, contained in Amendment No. 17 to M.P.R. 149 (Mechanical Rubber Goods), effective June 28, apply to strip rubber made in whole or in part of either neoprene or GR-S. Generally, strip rubber is sold by producers directly to manufacturers who use it in the making of baby pants, bathing caps, underwear, dish covers, etc.

The ceilings, ranging from 93.7c to $3.20 a pound, depending on strip gauge and the type of synthetic used, are in line with existing ceilings of producers. They are, however, generally lower than the prices of many new resellers and consequently will require a reduction in their prices.

BICYCLE TIRES

An increase of approximately 20% in ceiling prices for sales to bicycle manufacturers of the principal size of synthetic rubber bicycle tire assemblies was provided by OPA in Amendment No. 9 to M.P.R. 435 (New Bicycle Tires & Tubes). This increase, effective July 5, must be absorbed by the bicycle manufacturers as it cannot be passed on to consumers. Bicycle prices are frozen at March, 1942, levels, most of them in specific dollar-and-cent terms.

The increase amounts to 55 cents for each assembly, consisting of two tires, two tubes and two rim strips, size 26 x 2.125. This size represents approximately 80 per cent of the total production of bicycle tire assemblies. OPA said the increase was mandatory under the Price Control Act. A study of production costs, undertaken at the request of the three manufacturers now engaged in producing these assemblies, showed that the higher ceilings are necessary to enable them to cover their average factory costs.

It was pointed out that a slightly larger increase previously had been granted on sales of bicycle tires and tubes in the replacement trade, but that no increase had been allowed before in the ceilings of tire and tube assemblies sold to bicycle manufacturers for use as original equipment. On other sizes and types of assemblies, manufacturers will continue to use their highest March, 1942, prices as the ceilings.

DRUG SUNDRIES

Two modifications in the existing list of dollar-and-cent ceiling prices for rubber flat goods are contained in Amendment No. 1 to R.M.P.R. 300 (Rubber Drug Sundries) and Amendment No. 1 to R.M.P.R. 301 (Retail & Wholesale Prices for Rubber Drug Sundries). The changes, effective June 26, which apply to sales by manufacturers, wholesalers and retailers, are:

1. The specific ceilings for combination syringe attachment sets and invalid rings and cushions are discontinued. Manufacturers will use their December 1, 1941, prices for these items, while wholesalers and retailers add their allowed mark-ups.

2. The specific ceilings for molded ice caps will apply only to those types sold by manufacturers on the December 1, 1941, base date at a net price of from 44 to 48 cents each. For all other types, manufacturers take their December 1, 1941, prices, and wholesalers and retailers add their specified mark-ups.

OPA said that in both cases the use of base-date prices is being allowed so that former prices can be resumed on lines that have been off the market because of wartime restrictions and that are now coming back into production. The dollar-and-cent ceilings now made inapplicable were not intended to cover the better type products that can now be produced but represented base-date prices for limited wartime types.

RUBBER HALF SOLES

A retail ceiling price of 40c a pair for men's black rubber half soles rejected by the Army as not up to required standards has been established by OPA in Amendment No. 12 to M.P.R. 477 (Sales of Rubber Heels & Soles in the Shoe Factory and Home Replacement Trades). Such soles are now being distributed in civilian channels. The ceiling, effective June 26, applies to sales by chain, hardware and other retail stores of soles a quarter of an inch thick and in military sizes 7 to 13, these sizes generally being larger than the same sizes for ordinary civilian soles.

The ceiling compares with existing ceilings of 40 and 45 cents for equivalent sizes of corded rubber half soles already selling in the home replacement trade. A size 7 in these corded half soles has a 35-cent ceiling, but this sole is smaller than the size seven in the rejected Army half soles.

Manufacturers' ceilings, per dozen pairs, are $2.16 for assorted sizes 7 to 11, and $2.25 for sizes 11 to 13, either sold assorted or all of one size. Wholesalers' ceilings, per dozen pairs, are $2.88 for assorted sizes 7 to 11, and $3.00 for sizes 11 to 13, either sold assorted or all of one size.

MISCELLANEOUS ORDERS

In addition to the foregoing, the following recent regulations are of interest to the rubber industry:

Eighteen rubber footwear items rejected by the Armed Forces as not up to required standards have been given ceiling prices for all sales in civilian channels. The prices are contained in Order 4 under M.P.R. 132 (Certain Rubber Footwear) and are effective as of June 18, 1945.

Under the terms of Direction 2 to Order M-375, issued on June 30, rubber-coated canton flannel work gloves may be sold by manufacturers and processors on and after July 7, 1945, only to fill orders bearing preference ratings. The direction applies to all types of band top, gauntlet style, or knit wrist canton flannel work gloves that have been immersed, sprayed or coated with rubber of any type.

Coumarone-indene resins, which find many applications in rubber compounding, have been placed under the control of Schedule 110 of Order M-300, the general chemicals allocation order. It was announced on June 30, however, that quantities of such resins remaining after military and essential civilian requirements are satisfied will be released for miscellaneous civilian uses through normal trade channels.

Calco Buys Sherwin Plant

The Calco Chemical Division of the American Cyanamid Co. has purchased at public auction the Gloucester City, N. J., plant of the Sherwin-Williams Co. The plant was originally built for experimental production of titanium dioxide. Calco's present plans for the plant call for a program to make certain changes in the process of titanium dioxide manufacture, utilizing experience gained at the company's factory in Piney River, Va.

SURVEY INDICATES TIRE LOSSES WILL CLIMB TO 6,000,000 UNITS

Tire losses on the cars of the nation's war workers and all other essential B and C car drivers will climb to at least 6,000,000 tires in the next 90 days of hot weather driving, according to an announcement made by the Rubber Manufacturers Association on June 14. The forecast was based on the first comprehensive study of tire wear prepared on a nation-wide, state-to-state, and city-to-city basis. The work was done by the rubber manufacturing industry and the Association at the request of the WPB Rubber Bureau.

A. L. Viles, president of the Association, said the survey shows that a minimum of 20,000,000 passenger car tires will go off the road in 1945. "Tire failures after four years of heavy war duty will call for at least 6,000,000 replacements between now and early September, the hot-weather period of heaviest tire wear," he said.

"Losses could go higher if there is any relaxation of tire care, for the estimates were based on the cooperation of every driver in continuing strictest tire conservation through the summer months. Thus conservation continues as the Number One obligation of every driver for the next three months.

"The fact that the civilian tire outlook is brighter today than at any time since Pearl Harbor in no way relieves the need for continuation of the 35-mile-an-hour victory speed limits and tire care through June, July and August," Mr. Viles said.

"Beyond the hot weather period lies great hope that the needs of all essential civilian drivers will have been met and the the Government can begin to whittle down the long deferred tire demands of 10 million A-card holders. With enough improvement in manpower and supplies of critical tire materials, limited numbers of tires could be made available to A-card holders before the year is out, and certainly the prospects are good for meeting most of their tire requirements in 1946. This is contingent upon our ability to fill a Pacific supply line three times longer than the one of Europe and any increases in the fourth quarter of present estimates of tire needs for the one-front war."

Change Tube Repair Prices

Service stations and other tire repair shops that are prevented from making additional charges for extra services connected with tube repair jobs only may now apply for permission to make additional charges, under the terms of Amendment No. 2 to R.M.P.R. 528 (Tires and Tubes, Recapping and Repairing, and Certain Repair Materials). This action, effective June 30, applies to such services as pick-up and delivery, mounting and demounting of tire and tube from wheels, and road service for emergency repair jobs involving tube repairs.

Since May, 1944, tube repairs have had dollar-and-cent ceiling prices, with passenger car tube repairs generally held to 50 cents. Repairmen have been permitted to charge for extra services connected with the actual tube repair job if they had a separate charge for such services during March, 1942.

The new action is designed to afford relief to service stations and other repair shops that in March, 1942, did not have a separate charge for extra services but customarily either supplied the services free or had one charge for both the tube repair job and the extra services. Relief also may be sought by those with "frozen" base period charges that are now considered inadequate for extra services involving tube repairs.

Tire Quotas for July

The July tires quotas, announced by OPA on June 26, are similar to the June quotas, with the exception of truck and bus sizes, both categories of which were increased. Passenger and motorcycle tires remain at 2,500,000 units, and tractor-implement tires, size 7.50 or smaller, remain at 70,000 units, and sizes larger than 7.50 at 40,000 units. Truck and bus tires, sizes 7.50 or smaller, were set at 386,862, as compared with 360,600 for June, and sizes 8.25 or larger at 234,308 against 189,750.

To provide 2,500,000 passenger and motorcycle tires for July, OPA pointed out, it was necessary to borrow 833,334 tires from inventories. The July quota in this category reduced inventories because only 5,000,000 passenger tires were made during the second quarter of the year, an average of 1,666,666 tires a month. In fact, the July quota is 500,000 tires in excess of anticipated monthly production for the next quarter, set at 6,000,000 units, an average of 2,000,000 per month.

Amendments to Ration Order

Two additional amendments to Ration Order 1A (Tires, Tubes, Recapping and Camelback) have been issued since our last report, as follows:

Amendment No. 99, issued on June 18 and effective June 23, freezes each tire dealer's inventory at his June 30 total of Grade 1 tires plus certificates, except for allowable changes which include transfers from dealers who are quitting business and changes occurring when tires are sold back to dealers by consumers. It also provides that authorizations issued by OPA district directors prior to June 1, 1945, permitting the transfer of Grade 1 tires between dealers, will no longer be valid after June 23, 1945. The amendment also contains provisions which allow new passenger tires to be used on certain vehicles converted to farm use.

Amendment No. 100, issued July 3 and effective July 6, makes it possible for veterans of the present war to become tire dealers on a small scale. Should the veteran establish himself as a tire dealer, he will be given certificates to buy a stock of 10 passenger tires, 4 small and 2 large truck tires, and 6 tractor-implement tires. As the tires are sold, the veteran may replenish his stock by sending the certificates to his supplier for replacements.

Metex Mold Cleaner

Some time ago the firm of MacDermid, Inc., 526 Huntingdon Ave., Waterbury 88, Conn., introduced a product called Metex Plastic Stripper for salvaging metal inserts from scrap molded articles. Since its introduction it has been determined that the material can successfully be applied for the stripping and cleaning of rubber molds, especially of the chromium-plated type. The material is generally used at a concentration of 1 to 2 pounds per gallon and at the boiling point. The molds to be cleaned are placed in the solution for a requisite period of time to remove the carbonaceous material which is deposited on the surface of the mold. The solution loosens the bond of the contaminating material with the metal in the mold by means of a selective wetting property and thus removes the material. Small pieces of rubber which might remain on the molds are not generally attached by the stripper solution but are so loosened that they are very easily removed by means of a brush or simply by pulling them from the surface. MacDermid is also producing a special compound for washing molded rubber articles free from zinc stearate and other powdery films without the use of brushing.

Uphold Titanium Cartel Charges

The government won its civil anti-trust action against E. I. du Pont de Nemours & Co., Inc., the National Lead Co., and the latter's wholly-owned subsidiary, the Titan Co., when Federal Judge S. H. Rifkind on July 11 sustained a complaint that the three defendants were part of a world monopoly in the production and sale of titanium. According to the government suit the defendants were members of a world-wide combination or cartel, the purpose of which was to restrain and monopolize trade and commerce in the titanium industry. More than $60,000,000 worth of titanium was hold in the calendar year of 1944. Other members of the combination mentioned in the complaint but not defendants in the proceedings included I.G. Farbenindustrie, the German chemical trust. While Judge Rifkind ruled for the government in his decision, he did not specify the relief to be granted. This is expected to come in a later decree. Although many anti-trust actions prepared by the government for prosecution have been postponed because of the war, the titanium case was the first released by the War and Navy departments for trial.

GOODYEAR UNITS OPERATING UNDER NAVY SUPERVISION

On orders of President Harry S. Truman, the Navy Department took over operation of the five plants of the Goodyear Tire & Rubber Co. in Akron on July 5. The action occurred after some 16,000 workers affiliated with the United Rubber Workers of America (CIO) had staged a 20-day walkout and had defied War Labor Board back-to-work orders seven times. The strike began on June 16 after failure of negotiations on 32 disputed wage, hour and working condition issues.

Seizure of the plant, the first in the tire field but the second in the rubber industry (the Lord Manufacturing Co., Erie, Penna., was taken over by the Navy several months ago on a price dispute), was made by the Navy because it lets most of the Goodyear contracts.

The strike started after expiration of the 30-day "cooling period" required by law and continued despite efforts of the War Labor Board, International executives of the U.R.W.A., pleas from Army and Navy executives that it was interfering with the progress of the war in the Pacific, and threats of recriminations from WLB and Selective Service headquarters to induct young draft-exempt workers. Officials of the Goodyear local stuck to their guns throughout the walkout but approved a return to work as soon as the Navy took over.

Work Returning to Normal

It is estimated that approximately 85% of the workers returned to the plant within three or four days after official seizure. Capt. H. K. Clark, a member of the Navy's Emergency Management Committee, and vice-president of the Norton Co., of Worcester, Mass., in civilian life, is in charge of the plants.

In announcing seizure of the Akron plants, President Truman said that he acted on the recommendation of William H. Davis, Director of Economic Stabilization, who reported that Goodyear production was "urgently needed by our armed forces." Although the Navy took over operations, Mr. Davis said that the Army, too, regarded the strike as so serious that "it threatens to upset operational plans in the Pacific."

Government possession of the plants will terminate "within sixty days after productive efficiency has been restored." Under a plan advanced by Capt. Clark, the present management of the plant continues in operation subject to his orders, with full authority on labor relations reserved to the Navy staff.

The production loss during the 20-day strike has been tremendous. According to Goodyear officials, the loss of tires alone amounted to more than 300,000 for the military and 77,000 to civilians. The shut-down of the synthetic rubber plant operated by Goodyear at Akron for the government resulted in a loss of approximately 4,000 tons. Losses in other products, including hose, belting, bogie wheels, half-tracs, foamed latex goods and rollers, have not been calculated at this writing.

Seizure of the Goodyear plants is no indication of settlement of the grievances of the workers. Following normal routine, the Navy Department has referred these grievances to the War Labor Board. Although some of these grievances may be ironed out during the Navy tenure at the plant, the majority of them will probably still be in the hands of WLB after the plants are returned to Goodyear.

Approximately 15,000 members of the Firestone local of the U.R.W.A. walked out of the Firestone Tire & Ruber Co. plants in Akron on July 1 following a membership meeting which voted against acceptance of the company's proposals in contract negotiations. This strike is still continuing at this writing (July 11) and is following the procedure of the Goodyear strike almost step-by-step. Officials of the Firestone local are also defying orders of WLB to return to work before negotiations with the management will be resumed.

Coming Events

July 21-22. Los Angeles Rubber Group, Annual Outing, Uplifters' Club, Santa Monica, Calif.

July 27. Chicago Rubber Group, Outing, Hickory Hills Golf Club, Chicago, Ill.

Sept. 13. Detroit Rubber & Plastics Group, Detroit, Mich.

Sept. 21. N. Y. Rubber Group, Building Trades Club, New York City.

Sues Over Microscope Patents

Professor Reinhold Rudenberg, Gordon McKay Professor of Electrical Engineering at Harvard University, has started suit in the Federal Court in Boston, Mass., against the Alien Property Custodian and Siemens-Schucker twerke of Germany to regain possession of certain patents which are said to be the basis of the electron microscope. These patents—Nos. 2,058,914 and 2,070,-319—were issued in the United States in 1936 and 1937, but are said to have priority rights in Germany dating from 1931. At the time he developed the inventions, Prof. Rudenberg was chief engineer of Siemens. Subsequently, he came to the United States. In 1942, shortly before he became a citizen, the patents were sequestered by the Alien Property Custodian. Beyond a few statements in scientific journals, Prof. Rudernberg has heretofore made no attempt to press his claims as inventor of the microscope in this country.

PRODUCTION OF "ETHANITE" PLANNED FOR NEAR FUTURE

Production of "Ethanite Rubber," a new synthetic rubber based on natral gas, which has been under development for about three years, is expected to advance from the pilot plant to the commercial stage in the near future. Production facilities are being provided by a Detroit syndicate, including a number of prominent businessmen, who are reported to have invested approximately $250,000 to date.

Ethanite Rubber is said to possess the wear and resiliency of natural rubber and to be superior to such rubber in resistance to sunlight and oil. It is reported to have proved satisfactory for the manufacture of mechanical goods, and tests are currently being conducted as to its potentialities in the manufacture of tires. Although specific costs will not be determined until the commercial production facilities are completed, they are not expected to be above that of the lowest cost government GR-S plants.

According to a recent issue of *Business Week*, the enterprise grew out of exploratory work of the Top O' Michigan Oil Syndicate, members of which include M. Burleigh, president of the Great Lakes Greyhound Lines; T. M. Rinehart, president of the Highland Oil Co.; H. Fruehauf, vice-president of the Fruehauf Trailer Co.; and A. S. Hickok, president of the Hi-Speed Gas Co. The syndicate owns mineral rights to land in Michigan which produces natural odorless methane gas.

Methane gas contains some 55 pounds of solids per 1,000 cubic feet, with little sulfur. Dr. Glenn C. Casto, of Parkersburg, West Virginia, head of the Casto Rubber Co., was brought in to test his belief that these solids could be isolated and synthetic rubber produced. The process developed by Dr. Casto calls for the heating of the gas to 2800°F. and then compressing and refrigerating it to —80°F., producing liquefaction. The material is then brought to one of three refractory towers in which it is fractionated as it rises to the top. About 8 pounds of Ethanite Rubber are eventually produced from each 1,000 cubic feet of the gas.

Merchandising plans of the Detroit syndicate are reported to be in the formative stage at present, but under an early arrangement approximately half of its production will go to the Standard Products Co. of Detroit, manufacturers of rubber and plastics products.

Names New England Agent

Godfrey L. Cabot, Inc., Boston, Mass., has announced the appointment of the Raw Materials Co., 77 Franklin St., Boston, Mass., as its New England agent for its complete line of carbon blacks and pine tars. The Raw Materials Co. is a new company organized by C. W. Bloom, for many years general sales manager of the Cabot organization.

PHILADELPHIA GROUP MEETING FEATURES TWO GOOD PAPERS

Technical papers delivered by H. G. Evans, of Stanco Distributors, Inc., and Roderick Eskew, of the Eastern Regional Laboratories of the U.S. Department of Agriculture, featured the meeting of the Philadelphia Rubber Group, held on June 15, at the Benjamin Franklin Hotel, in Philadelphia. Approximately 120 members and guests were in attendance. Entertainment was furnished after dinner.

Prior to the technical session, copies of a proposed "Constitution and Code of Ethics" for the group were distributed to those present. Comments and criticisms were requested and it was announced that the constitution and code will be presented for approval at the next meeting of the group. Among other things, the constitution calls for a speakers' committee, which will comprise the vice-chairman of the group and two directors, and a social committee, comprised of three active members, which will be in charge of dinners, outings, entertainment, prizes, etc. It was also announced that the group will hold an outing some time in September. William B. Dunlap (Lee Tire) will act as Outing Chairman.

Evans Discusses Post-War Synthetics

Mr. Evans, the first speaker, discussed "Post-War Synthetic Rubbers" and dealt largely with the butadiene-acrylonitrile polymers, Butyl rubber and experimental isobutylene-styrene copolymers. He briefly reviewed the wartime development of the butadiene-acrylonitrile types and predicted a post-war price structure that might approach that of GR-S. He also predicted an expanding demand for such rubber in the post-war period, particularly stressing its potentiality in the foamed latex field. Regarding properties, he pointed out that higher acrylonitrile content in the polymers resulted in easier processing, but unfortunately lowered physical properties, adding that continued research may eliminate this difficulty.

As for Butyl Rubber, Mr. Evans stated that the present production rate was running around 63,000 tons a year, with an increase of 25% predicted by the end of the current year. Inner tubes now consume 95% of Butyl output, he said, with the balance going into special applications requiring a low degree of permeability. The availability of Butyl rubber for some civilian purposes by the year-end was predicted as was expanding use for the polymer when its full possibilities had been investigated.

Continuing his discussion of Butyl rubber, the speaker presented data on several polymers with different degrees of unsaturation. Products with higher unsaturation resulted in higher modulus stocks with lower growth when used for inner tubes. Contrary to earlier beliefs, the aging characteristics of the products with a higher isoprene content are superior to that with the theoretically correct amount of unsaturation for vulcanization. Because of the better maintenance of pressure resulting from lower permeability, inner tubes made of Butyl rubber show a 10% improvement in tread wear over those made of natural rubber.

Turning to the isobutylene-styrene copolymers, Mr. Evans exhibited sheet materials made from such products. He explained that three experimental grades are now under consideration: S-60, a brittle type plastic; S-50, a resinous product; and S-40, a flexible, rubbery material. All of these are of high molecular structure, it was explained, but low molecular products of the same type are being investigated as tackifiers. Mr. Evans also stated that low molecular weight butadiene-styrene copolymers are being investigated as drying oils.

Domestic Rubber Sources Outlined

The wartime efforts of the Department of Agriculture in producing domestic natural rubber were outlined by Mr. Eskew, the second speaker, in a paper on "Domestic Sources of Natural Rubber." Many plants were investigated but were discarded because of low rubber content, low yield per acre, low quality rubber hydrocarbon, or high cost of extraction. Among those abandoned, according to the speaker, was the rabbit brush, which had a yield of only 1% of low grade rubber extracted with difficulty by solvent treatment. Colorado rubber weed, on the other hand, gave a product somewhat better in quality than guayule, but was abandoned because of its scarcity. Cryptostegia was found to have a yield of 150 pounds per acre, but was dropped because of its cost, well over $1.00 a pound. The guayule rubber program, which still continues, was found to be the most practical.

Mr. Eskew laid particular emphasis on *kok-saghyz* as a potential source of high-grade natural rubber. Of the plantings carried out throughout the country, those from districts in Michigan, Minnesota and Wisconsin gave the most promising results. The roots of this plant have an average yield of 10% rubber on a dry weight basis, with a maximum of 22%. Valuable by-products are recoverable and the speaker estimated that yield could be brought up to 300 to 400 pounds per acre per year by selective breeding. Cost of production, not including the cost of growing the roots, is about 9c per pound.

In concluding his talk, Mr. Eskew referred to the cooperative tire testing program conducted by two manufacturers, the results of which indicated that *kok-saghyz* is the most promising substitute for Hevea rubber. Ratings applied to four substitution products indicated the following order of quality: (1) *kok-saghyz;* (2) GR-S; (3) cryptostegia; (4) guayule.

GOODYEAR MANILA OFFICE AND WAREHOUSE DAMAGED BEYOND REPAIR

The building housing the head office of the Goodyear Tire & Rubber Co. in the Philippine Islands, shown in the accompanying illustration, was damaged beyond repair in the recent battle for Manila. The interior of the building, a large reinforced concrete structure which also included warehouse space, was gutted by air raids and gunfire. Only the shell with part of the walls remains standing. The upper floors have collapsed and the ground floor is covered with debris. The building is located along the Pasig River, just outside the walled part of Manila and adjacent to the Philippine treasury building, where the Japs made their last stand. It had previously come in for bombings in the initial air raid on Manila just after the attack on Pearl Harbor.

RECORDED RUBBER HISTORY CHANGED BY NEW DOCUMENT

Discovery of an old Spanish manuscript which is said to change the recorded history of rubber was disclosed by the Firestone Tire & Rubber Co. on June 26. The document, published by the Middle American Research Institute of Tulane University in cooperation with Firestone, is reported to push back the date for the first extensive commercial use of rubber about 40 years.

The manuscript, entitled "Experiments With Rubber In Mexico," indicates that Charles MacIntosh can no longer be credited with being the first to use rubber successfully in waterproofing fabric, although the Scotchman's process announced in 1823 was so famous that rubberized water-repellent coats still are called MacIntoshes.

The experiments covered in the paper were made between 1785 and 1798 and portions of the manuscript, written the year they began, reveal that rubberized textiles had been used for some time. The experiments were conducted on orders from the Marquis of Branciforte, the Viceroy of Mexico, in an effort to find a leak-proof container for quicksilver used in gathering gold from the streams of Central America.

S. K. Lowe, Acting Director of the Institute, is the transiator of the manuscript. He discovered it in the library of the Institute, which specializes in the archaeology of Central America. The manuscript was one of a group of viceregal and church papers found in Mexico. Mr. Lowe comments in his introduction to the translation that the paper shows that in 1785 rubberized cloth already had been known "for years, perhaps generations."

A portion of the manuscript declares that from rubber-treated strips of cloth "are cut the desired pieces for making capes, small cloaks, riding packs, sleeveless cloaks, boots, shoes, carriage tops, outside coverings for boxes of paper, or packages for other effects, with the assurance that even though the packages contained in these covers by chance should fall into the water and remain there many days, no penetration, infiltration or soaking will occur."

The Spanish manuscript is divided into two sections. The first part contains all the data the viceroy could collect about rubber upon ordering the experiments in 1785. He sent this from Spain to Don Silvestre Diaz de la Vega, Director General of Tobacco Revenue in Mexico, who conducted the experiments recorded in the second half of the manuscript.

Along wtih the data the viceroy sent Don Silvestre a letter telling him that a new container must be found for shipping mercury from Spain to Mexico for use in gathering gold. He said 8,889 pounds of this precious metal were lost in a five-year period during which it was shipped in chamois bags.

The Director of Tobacco Revenue was selected to do the job because the viceroy thought rubber might make an ideal container and Don Silvestre was near the source of Castilloa rubber. Don Silvestre solved the problem by developing a rubber bag, placing it inside a chamois bag, placing a rubber sack on the outside of these two, and covering all three with a second chamois bag.

As final proof of the success of the experiments 50 pounds of quicksilver were shipped from Mexico to Spain in the double rubber-lined chamois bag to prove that it would not leak.

Surplus Airplane Tires

Thousands of airplane tires, constituting a variety of sizes of trail and landing wheels from fighting transport planes, are ready, after a one-section repair, to be used on automobiles, tractors, combines, etc. The assortment represents about 50% of all airplane tire sizes manufactured and are on hand at Mogadore, Ohio, and Ontario, Calif. They will be sold through the sealed bid method. Information on sales can be secured from the Office of Surplus Property, 704 Race St., Cincinnati, Ohio, or 30 Van Ness Ave., San Francisco 2, Calif.

Hewitt Announces Changes

Hewitt Rubber Corp., Buffalo, N. Y., has recently announced the following changes in its personnel: Lester D. Bigelow, vice-president in charge of manufacturing, has been moved to Chicago, Ill., as supervisor of midwest sales, the position which he occupied before the war; Frank W. Blanchard, chief engineer, has been promoted to factory manager in charge of production in both Buffalo plants; Clayton H. Skinner, plant engineer, has been named chief engineer; T. C. Zinter has been named manager of belt sales and development; Harold C. Patterson, former assistant sales manager, has been appointed manager of hose sales and development; R. G. Mack, previously with the Sponge Aire Seat Co., Buffalo, has joined the latex foam product division; Steward Ogilby, formerly with the General Cable Co., has been assigned to chemical research on latex foam product development.

Firestone Granted "E" Award

The Firestone Rubber & Latex Products Co., Fall River, Mass., was granted the Army-Navy "E" award for excellence in the production of war materials on July 9. The award will be presented to company officials at appropriate ceremonies to be held in Fall River at a later date. The Farrel-Birmingham Co. recently received its sixth star, indicating continued production efficiency at all three of its plants.

PROPOSED GUAYULE PROGRAM OPPOSED BY LITCHFIELD

P. W. Litchfield, chairman of the Goodyear Tire & Rubber Co., Akron, in a recent statement took exception to the proposed government program for the subsidized planting of 400,000 acres of guayule with a fixed market price of 28c per pound. Warning that guayule may prove a costly white elephant to the taxpayers, Mr. Litchfield stressed the belief that the yield of the proposed project would come onto the market at a time when more than ample supplies of synthetic or high grade natural rubber will be available at prices ranging from 12c to 15c per pound.

As an alternative to the proposed plan, he favors the existing government guayule program, under which some 32,000 acres have been experimentally planted under the direction of the Department of Agriculture. This project, he pointed out, will keep the seed alive and produce ample quantities of guayule rubber to enable intelligent research into improving yields and extraction methods and lowering costs. As matters now stand, Mr. Litchfield asserted, guayule suffers under the chronic handicap of being much higher in resin content and thus rating only 80% as good as smoked sheets of natural Hevea rubber.

In a previous statement, Mr. Litchfield had estimated that within three or four years after the war, the total supply of natural rubber from the plantations of the Far East and the output of government synthetic rubber plants would be far in excess of world demand. Adding the output of the 400,000 acres of guayule now being considered by Congress would further increase the surplus and under the fixed price plan, he asserted, might endanger the free market.

Furthermore, he declared, governments of tropical America, where we are trying to encourage the development of natural rubber plantations, would view our guayule expansion program with misgiving, and doubt would arise in the minds of the British and Dutch, to whom we are looking for our major supplies of Hevea rubber at reasonable prices.

Mr. Litchfield estimated that the proposed expansion program would cost in excess of $100,000,000 and that, in the end, the taxpayers and consumers of rubber products would be saddled with a costly and mistaken program.

North Bergen Rubber Formed

The North Bergen Rubber Mfg. Co., 2021 Fortieth St., North Bergin, N. J., was recently organized for the manufacture of molded rubber goods and rubber and plastic soling material. Officers of the firm include: Angiolo Treves, president; Gordon Milne, vice-president; Dario Treves, treasurer; and Victor Axelroad, secretary. G. Sacerdote is superintendent.

WEST COAST ATSC UNITS AID CONSERVATION EFFORT

Under the rubber conservation program of the Army Air Force, many items of AAF equipment are being repaired by the Air Technical Service Command at San Bernardino, Calif. Such items as aircraft tires, self-sealing fuel tanks, "Mae West" life vests, flying boots, and life rafts arrive from war theatres worn or damaged, and go back to the front virtually as good as new.

Thousands of tires and tubes, including all sizes for both aircraft and ground equipment, are now being handled each day, according to Capt. J. H. Gardiner, rubber conservation officer, and hundreds of flying boots arrive every month to receive new soles and heels. During 1944 the boot repair unit was able to turn out about 260 pairs per month, and in January, 1945, with 24 specially-designed molds in use, production soared to 800 pairs.

Molds for spot-repairing 56-inch tires, the size used for the B-24 and B-17, were developed by the branch leader and the foreman of the tire shop. The curing of major rim cut repairs on 56-inch tubes is accomplished with a special steam-heated plate designed by another foreman. A feature for tail wheel tubes is a combination steam mold, with four steam-heated pipes of varying sizes to which the tubes are clamped for curing spot repairs. In this manner repairs can be made on the inner side of small-diameter tail wheel tubes.

Quality of the retread jobs turned out by the plant was demonstrated on one of the first airplane tires rejuvenated, a tire for a C-47 transport. That tire was found recently to have made more than 100 landings, with much of its retreading still left. Even for a new tire that would be considered good wear.

At nearby Ontario, Calif., is the 856th AAF Specialized Depot, a facility of SBATSC, and one of two warehouses in the United States for the inspection and classification of scrap rubber collected by Army Air Force bases. In addition to checking tires and other rubber equipment to determine which can be repaired and which must be reclaimed as scrap, the depot also analyzes the cause of breakdowns. In this way it helps plan preventive maintenance to make rubber equipment last longer.

Last year the depot checked 117,532 tires, 33,077 tubes, and 12,472 self-sealing fuel tanks. Of the aircraft tires received, more than half are found suitable for repair, the rest are sent to reclamation plants as scrap.

Firestone's new plant at Cambridge, Ohio, is now in production on heavy-duty truck rims for civilian use.

Goodyear has developed a demounting stand for removing truck tires from rims which is being marketed by Wheel & Rim Sales, Toledo, Ohio.

Gilman Joins General Tire

Max M. Gilman

Max M. Gilman, former president of the Packard Motor Car Co., has joined the executive staff of the General Tire & Rubber Co., Akron. In his new post, Mr. Gilman, who has had a long career in both production and distribution, will study the post-war market potential with a view to adding a few basic items to General's merchandise line and to work out an over-all program for the company and its distribution outlets. A native of Wisconsin, Mr. Gilman entered the automotive field in 1919 as a truck salesman for the Packard Motor Car Co. In 1934 he became general manager of the company and in 1939 he was made president, retaining that position until 1943, when he resigned.

Lambert Represents South Asia

In addition to representing the Neville Co., Pittsburgh, Penna., on sales of coumarone resins, plasticizers, solvents and other coal-tar material to the rubber industry in the midwestern area, the newly-organized E. P. Lambert Co. will also represent the South Asia Corporation, natural rubber importers and dealers of New York City, in the same territory. The Lambert concern, which is headed by E. P. "Ted" Lambert, maintains headquarters in the First Central Tower, Akron 8, Ohio.

Dunlop Plans Expansion

Preparing for post-war expansion, the Dunlop Tire & Rubber Corp., Buffalo, N. Y., plans to enlarge its manufacturing facilities so that a top production of 60,000 tires a week can be attained. The company expects to produce an additional 10,000 tires a week by converting a portion of its plant which previously housed indoor tennis courts into a finishing department.

CARBON BLACK STATISTICS ARE FURNISHED FOR 1944

Increasing demand for synthetic rubber compounding, particularly in the late months of 1944, lifted sales and production of carbon black to new peaks, according to a report issued by the Bureau of Mines of the U. S. Department of the Interior on June 26. Total sales expanded 49 percent over 1943 to 937,430,000 pounds and were 135,570,000 pounds more than production. Producers stocks were therefore depleted to 69,243,000 pounds at the year-end, the lowest level since 1928, and continued to shrink in the first quarter of 1945.

Production gained 35 percent over 1943 to 801,860,000 pounds, or 207,795,000 pounds above the old high in 1941. The output by contact processes increased 9 percent in 1944, following a 3 year decline, but was 17 percent below the record of 1940. Furnace black production continued to grow rapidly, increasing 81 percent over 1943 to 387,184,000 pounds and equalling 48 percent of total production of carbon black in 1944, compared with 36 percent in 1943. All states except California reported a higher output of black in 1944, with the largest proportional gains in Kansas and Oklahoma.

Carbon black plants burned 355,770 million cubic feet of natural gas in 1944, a moderate increase (13 percent) over 1943 compared with the output gain (35 percent). The average yield of all grades of carbon black increased from 1.88 pounds per thousand cubic feet in 1943 to 2.20 pounds in 1944, influenced by the greater importance of high-yield furnace blacks. The average value of natural gas used by the plants advanced to 1.62 cents per thousand cubic feet, from 1.47 cents in 1943.

Record sales to rubber companies of 738,029,000 pounds, accounted for 79 percent of the 1944 total. Sales to ink and paint manufacturers and to miscellaneous industries including exports, were slightly above 1943. The average value of carbon black at the plants was 3.67 cents per pound in 1944, and 3.41 cents in 1942 and 1943. Three plants (2 channel in Oklahoma and 1 special contact type in Louisiana) were not operated in 1944 and 3 new furnace plants (1 in Oklahoma and 2 in Texas) began to produce.

Improve Bomb Neutralization

The U. S. Rubber Co. has developed a new, secret method of neutralizing enemy bombs which could previously be immobilized only by hazardous procedures, according to a statement of Dr. W. A. Gibbons, director of research and technical development of the company. The new techniques, which were perfected under the direction of the Ordnance Bomb Disposal Center at Aberdeen Proving Ground, are reported to have handled the best that the Germans or the Japanese could produce.

ORDNANCE DEPARTMENT ISSUES REPORT ON NORMOYLE FIELD OPERATIONS

With the announcement that large-scale testing at Normoyle Field, Texas, has been terminated and all equipment is being transferred to the Aberdeen Proving Ground, where operations will continue on a limited basis, the Ordnance Department on June 24 issued a report covering results of operations at Normoyle Field.

The test work carried on by the Tire Test Fleet of the Ordnance Department has enabled the Army to provide rugged, dependable synthetic tires for the largest truck transport system ever operated, according to Brig. Gen. Walter P. Boatwright, commanding general of the Office of the Chief of Ornance, Detroit, Mich., which supervised the project.

Organized in June, 1942

Organized by the Army in June, 1942, the test fleet served as a proving ground for military synthetic tires, tank bogies and tracks. It was operated for the co-operative Army-rubber industry development program by the Firestone Tire & Rubber Co., Akron, with S. R. Filer as general manager. Fiscal control was maintained by the St. Louis Ordnance District.

Lack of paved roads and the vast areas of mud and coral in the Pacific battle areas demand tires and tank tracks of most rugged design. Rubber products consisting of up to 100% synthetic rubber were subjected to climatic and terrain conditions that Army vehicles must tackle in the drive against Japan, the General explained, adding that these products stood up over long miles of the most punishing kind of service. Test trucks and tanks have run more than 150 million tire miles over the gruelling test course north of San Antonio, under all types of weather conditions.

Trucks that will have to drive through rice fields in the Far East were tested in 36-inch deep mud pits. For coast landing operations specially designed tires were tested in Corpus Christi Bay. Sand flotation tests to simulate desert conditions were conducted on Mustang Island in the Gulf of Mexico. In three years of operation on the 185-mile course, consisting of 70% hard surface highway, 15% cross country and 15% gravel, more than 25,000 tires have been tested on hundreds of vehicles, ranging from bicycles and jeeps to 20-ton tank transporters. These vehicles traveled close to 23 million miles in a continuous 24-hour a day, 7-day a week operation.

25,000 Miles Daily Average

The fleet ran an average of 25,000 miles a day. The 25-mile stretch of cross-country in Medina County, Texas, is hilly and curved and is pitted with jutting rocks that subject tires to roughest wear conceivable. Five hundred and seventy different types of tires were tested. Largest was the 1300-pound tire for giant cargo carriers, standing more than six and a half feet high and capable of carrying a load of 16 tons. Smallest was the 3-pound bicycle tire, 26 inches in diameter.

During a ten-month peak period in 1944, 132 trucks run by a crew of 470 drivers, in nine shifts, moved each day, carrying loads generally above stated capacities. Two and a half ton trucks carried five to eight ton loads, eight-ton trucks carried the heavier loads of more than 12 tons.

Some of the early tires with small percentages of synthetic rubber lasted 50 miles or less. Others gave out after 500 or 1000 miles. As industry made more of GR-S available, tires consisting of greater synthetic percentages were designed and tested. Today, more than 85 per cent of the army's tire needs are met by synthetic rubber. Tires for light passenger-type vehicles are 100 per cent synthetic rubber and have run as high as 40,000 miles over the rugged test course. Tires for the army's 2½-ton truck, containing more than 90 per cent synthetic rubber, have achieved mileages in excess of 20,000 miles under the most trying conditions. Tests were conducted on combat tires, capable of running flat, 40 or more miles after they have been punctured by shell fragments and small arms fire. Synthetics for giant cargo carriers and tank transporters have been the most difficult to develop, since they must carry huge loads they must be thicker and heavier.

Other Functions of Fleet

With tire testing the primary function of the fleet, performances of other synthetic rubber parts in vehicles such as fan belts, brake hose, and shock absorbers were also studied. In addition, "life histories" of all vehicle parts were maintained and forwarded to manufacturers for their information. It was found too that tubes made of Butyl rubber were superior to crude rubber tubes. Fleet operation also showed that rayon cord was vastly superior to cotton cord for tires.

At Camp Bullis, 56 track-laying vehicles, including the M4 General Shermans, the new M26 General Pershings and M24 General Chaffee light tanks, were operated over a 21-mile "torture course" to test newly-developed synthetic rubber bogies. Performance in these tests led the Army to adopt use of 100 per cent synthetic rubber on bogie wheel tires for our medium and heavy tanks. By replacing steel tracks with wider synthetic rubber tracks, tanks have obtained better traction and maneuverability. These changes were based on extensive testing in a mud pit 54 inches at its deepest point. When equipped with "grousers," long clamp extension that adds to the tank's gripping power, tanks have operated successfully in three feet of mud.

Dr. Wagner Joins Witco

Dr. E. F. Wagner

Dr. Edward F. Wagner, formerly process development engineer of the Standard Oil Co. of Ohio, has been appointed chief chemist of the Witco Chemical Co., where he will be engaged chiefly in directing product development work. Graduated from the Illinois Institute of Technology in 1938, Dr. Wagner received his M. Sc. degree in 1940 and his Ph.D. in 1945. While completing the graduate courses, he was an instructor in chemistry at the Institute. As an undergraduate, he participated in varsity basketball, baseball, and various school publications, and received the Alumni Award as the outstanding senior in his class. Dr. Wagner is a member of Phi Lambda Upsilon, Alpha Chi Sigma, Sigma Xi, and Tau Beta Pi.

Form Paul-Martin Rubber Co.

The Paul-Martin Rubber Co., 178 Sargeant St., Holyoke, Mass., was recently organized by Martin A. Jaffe for the manufacture of molded rubber goods, largely to specification. Mr. Jaffe was associated with the Paragon Rubber Corp. for eleven years as factory superintendent. Don Rasor, formerly associated for many years with both the Firestone Tire & Rubber Co. in Akron and the H. O. Canfield Rubber Co., in Bridgeport, Conn., is connected with the new venture as factory manager. According to Mr. Jaffe, the company will shortly move into larger quarters in Holyoke to take care of its expanding business.

Reduce Prices of Perbunan

Stanco Distributors, Inc., New York City, has announced a reduction, ranging from 7c to 10c, in the prices of Perbunan, effective as of June 1. The new prices, f.o.b. Baton Rouge, La., are as follows: Perbunan 26—38c per pound; Perbunan 18—37c; and Perbunan 35—43c.

BOSTON RUBBER GROUP OUTING ATTRACTS RECORD ATTENDANCE

The combined outing and summer meeting of the Boston Rubber Group, which was held at the Woodland Country Club, Newton, Mass., on June 22, was attended by approximately 380 members and guests, a large increase over last year's record turn-out. The outing committee was headed by C. A. Meyer (Standard Chemical), who was assisted by Richard K. Patrick (Windram) and Fred Langhorst (Hodgman).

Activities included a golf tournament, horseshoe pitching, cards, dart throwing and a soft ball game between T. C. Ashley's "Bear Cats" and L. C. Shaw's "Wild Cats." The "Bear Cats" won the ball game by a score of 19 to 6. In the horseshoe contest, first place went to the team of Don Wright (Hood) and Ben Mayo (Imperial Paper & Color) and second to John Stone (Hood) and Harvey Hutchinson (Hood). Ralph Huber was in charge of cards, Walter C. Weller of dart throwing, and Don Wright of horseshoes.

As usual, the feature of the outing was the golf tournament. Winners of the various events, all of whom received prizes, were: *Kicker's Handicap*—F. B. Ward (Panther-Panco), E. L. Hanna (Davol), and R. B. Patterson (Hood); *Low Gross*—H. Bainbridge, F. Follwell, and E. B. Curtis (Vanderbilt); *Low Net*—J. Sheehan, J. W. Finley, and H. A. Ryan; *Nearest Pin*—A. B. Harding, E. H. Garrison, and J. Andrew; *Most 5's*—A. J. Ryan; *Most 8's*—J. A. Williams (Haartz-Mason-Grower); *Highest Score*—R. Loveland (Vultex Chemical). E. E. Colligan (Plymouth) was in charge of the tournament.

Following an excellent dinner, there was a session of community singing under the direction of John Hach. Prizes given to the winners of the golf tournament and those won by holders of lucky tickets were made possible through contributions from the following firms:

Acushnet Process Co., Advance Solvents & Chemical Co., Akron Standard Mold Co., American Bleached Goods Co., American Finish & Chemicals Corp., American Zinc Sales Co., Angier Products Co., Archer Rubber Co., T. C. Ashley Co., Avon Sole Co., Bakelite Corp., J. T. Baker Co., Baldwin-Southwark, Barrett Division, Binney & Smith Co., Bortman Plastics Co., Boston Woven Hose & Rubber Co., Brockton Machine Co., Bunatak Chemical Co., Godfrey L. Cabot, Inc., Calco Chemical, Caldwell Co., Callaway Mills Co., Cambridge Rubber Co., Carbide & Carbon Chemicals Corp., Carter Bell Mfg. Co., Coated Products Co., Commercial Solvents Corp., Continental Carbon Co., Continental Mexican Rubber Co., Converse Rubber Co.

Also Deecy Products Co., Delco Rubber Co., R-B-H Dispersions, Inc., Dow Chemical Co., Downer, Hunnewell & Co., E. F. Drew & Co., DuPont, Eagle Picher Sales Corp., Wm. D. Eggleston Co., Farrel-Birmingham Co., Flightex Fabrics, Inc., General Atlas Carbon Co., General Dyestuffs Corp., General Latex & Chemical Co., General Magnesite & Magnesia Co., Glidden Co., Haartz-Mason-Grower Co., Alfred Hale Rubber Co., C. P. Hall Co., Hercules Powder Co., Herron Bros. & Meyer, Hird & Connor, Inc., Hodgman Rubber Co., Hood Rubber Co., J. M. Huber, Inc., Ralph Huber, Hycar Chemical Co.

Also Imperial Paper & Color Corp., *India Rubber World*, Innis, Speiden & Co., Ernest Jacoby & Co., Kalix Mills, Keystone Lubricating Co., D. H. Litter Co., Malrex Chemical Co., Midwest Rubber Reclaiming Co., Monsanto Chemical Co., Moore & Munger Co., H. Muehlstein & Co., National Rubber Machinery Co., National Sherardizing & Machine Co., Naugatuck Chemical, Neville Co., N. J. Zinc Sales Co., Oakite Products, Inc., Odell Coated Fabrics, Pacific Mills, Inc., Panther-Panco Rubber Co., Pennsylvania Industrial Chemical Co., Pequanoc Rubber Co., Philadelphia Rubber Works, Philipp Bros., Phillips Petroleum Co., Pittsburgh Plate Glass Co., Plymouth Rubber Co., Pratt & Lambert, Inc.

Also Quabaug Rubber Co., Raffi & Swanson, Inc., Reichard-Coulston, Inc., Reichold Chemical Co., Rosenfield Printing Co., John Royle & Sons, RUBBER AGE, A. Schrader's Son, A. Schulman, Inc., Scott Testers, Inc., Sessions-Gifford Co., Sharples Chemicals, Inc., Shell Oil Co., Socony Vacuum Oil Co., Stamford Rubber Supply Co., Stanco Distributors, Inc., Standard Chemical Co., Standard Lime & Stone Co., Standard Ultramarine Co., Stanley Chemical Co., Stauffer Chemical Co., Stedfast Rubber Co., Stewart Bolling & Co., Stowe-Woodward, Inc., Sun Oil Co.

Also C. J. Tagliabue Mfg. Co., Texas Co., Textile Proofers, Inc., Thiokol Corp., Wm. Thropp & Sons Co., Titanium Pigments Corp., Turner Halsey Co., Tyer Rubber Co., Union Bay State Co., United Carbon Co., U. S. Rubber Reclaiming Co., R. T. Vanderbilt Co., Vansul Co., Waltham Bleach Dye Works, Warwick Chemical Co., Weller Chemical Co., L. G. Whittemore, Inc., C. K. Williams Co., Wilmington Chemical Corp., Charles T. Wilson Co., Windram Mfg. Co., Witco Chemical Co., Woburn Degreasing Co., Xylos Rubber Co.

Gas Mask Components

The usable components of some 5,000,000 out-dated military gas masks in the hands of the Chemical Warfare Service are being put to further military use, while the non-serviceable residue of such masks is being sold for commercial use. The rubber facepieces, with modification, find a place in new issue masks. Undamaged hose tubes are likewise utilized. The wide webbing of the gas mask carriers is being utilized for sleeping bags and suspender belts, and the narrow widths for present carriers. Parts too damaged for reclamation have already been made commercially into bicycle handlebar grips, fishhook holders, flower pots, kitchen deodorizers, mothball holders, toys and other gadgets. It is estimated that fully 60 to 75% of the obsolete masks will be saved for further military use.

Chicago Outing July 27

The Chicago Rubber Group will hold its annual summer outing on Friday, July 27, at the Hickory Hills Golf Club, Chicago, Ill. The group departed from its established custom of holding the outing on a Saturday afternoon in order to allow out-of-town guests to be present and to get a better golf course. J. T. Adams (Sears-Roebuck) is chairman of the Golf Committee, and V. K. Melvin (Inland Rubber) is assistant chairman. As usual, prizes will be distributed.

Dehydrated packaging with Pliofilm of such articles as outboard motors, sewing machines, refrigerator compressor units, saws, and shotguns is being carried on experimentally by Goodyear.

NORTHERN CALIFORNIA GROUP HEARS MILLER ON GUAYULE

A talk on "New Developments on Guayule" by George W. Miller, research chemist associated with the Government Emergency Rubber Project, was the feature of the final meeting of the 1944-45 season of the Northern California Rubber Group, held at the Hotel Claremont, Berkeley, Calif., on June 28.

In his talk, Mr. Miller first outlined the history of guayule prodction, then discussed possible future improvements under the following headings: (1) Elimination of pre-extraction conditioning; (2) Studying methods of de-resinating (including alcohol-potash solution, bacterial action on chopped shrub, substitution of Jordan paper maker for the pebble mill, and extraction as latex); and (3) Improvements of quality. The talk was followed by a general discussion.

At the business meeting, plans for the summer outing were discussed and an appropriation was made. Lyn Shafer, program chairman, also outlined ideas for the Fall meetings. On the schedule for September is a report on "New Developments in Synthetic Rubber," to be given by members of the Shell Development Corp. For October and November it is planned to have a report on carbon black by staff members of the Binney & Smith Co. and a talk on the "Development of Synthetics as Related to Tires" by E. W. Booz, factory manager of the Pacific Rubber & Tire Mfg. Co., Oakland, Calif.

A door prize, consisting of five dollars in war savings stamps, donated by the Pioneer Rubber Mills, San Francisco, Calif., was awarded to Paul Rebe, production engineer of the General Cable Corp., Emeryville, Calif.

An earlier meeting of the Group was held at the Hotel Claremont on May 31. E. R. Vinson, of the Westinghouse Electric & Mfg. Co., the featured speaker, gave a talk on electronic methods of curing rubber. Mr. Vinson's talk included a discussion of the theory and background of induction and dielectric heating by electronic methods, a review of methods and technique now used in industry, a forecast of probable uses of electronic heating in the rubber industry, and a discussion of the economic considerations of applying electronic heating to indstrial uses.

"The Amazon Awakens," an animated Walt Disney cartoon, showing rubber plantations in Brazil and the methods of processing the rubber, was also shown.

Baker Chemical Plans Expansion

The J. T. Baker Chemical Co., Phillipsburg, N. J., which recently announced its entrance into the organic chemicals field, has acquired a site of 275 acres near Phillipsburg. The company is planning to construct a plant for expanded production of organic raw materials and intermediates.

NAMES IN THE NEWS

R. M. HOLLINGSHEAD, Jr., has been elected chairman of the R. M. Hollingshead Corp., Camden, N. J., succeeding the late R. M. HOLLINGSHEAD.

A. C. MARTIN, who has been asociated with the U. S. Rubber Co. since 1936, most recently as eastern representative of the airplane tire department, has been appointed manager of that department.

DR. LEWIS LARRICK, who since 1932 has served as a research physicist in the laboratories of the B. F. Goodrich Co., Akron, has resigned to join the staff of the Institute of Textile Technology, Charlottesville, Va.

DAVID H. FORBES, until recently associated with the Bradstone Rubber Co., Woodbine, N. J., is now with Thermoid of California, Inc., at Los Angeles, Calif., as chief chemist of the technical control laboratory.

F. C. ATWOOD, president of the National Atlantic Research Corp., Newton Center, Mass., has been appointed research adviser to the Vermont Industrial Agricultural Products Commission.

DR. AUBREY CLARE HILDRETH and PAUL H. ROBERTS, both of the U. S. Department of Agriculture, Washington, D. C., are currently in Mexico at the request of the Continental-Mexican Rubber Co. to assist in the production of guayule rubber. DR. ROBERT D. RANDS, also of the Department of Agriculture, is at present on an inspection and conference trip to cooperative government rubber investigation projects in Latin and Central America.

J. C. RAY, sales manager of the Fisk tire division of the U. S. Rubber Co., was recently elected to serve a second successive term as president of the New York Sales Managers' Club.

C. BLAKE GALBRAITH, works manager of the Cambridge Rubber Co., Cambridge, Mass., has been elected a director and vice-president of the company.

FREDERICK T. WINDSOR, who for the past nine years has been engaged in sales promotion and development work for the Firestone Tire & Rubber Co., Akron, has been appointed assistant sales manager of the Pennsylvania Rubber Co., Jeannette, Penna.

ROBERT M. HONEGGER, superintendent of the gear plant of Farrel-Birmingham Co., Inc., Buffalo, N. Y., has been appointed general manager of the plant, succeeding LESTER D. CHIRGWIN, now located at the Ansonia, Conn., plant.

FRANK M. MALY, who was formerly associated with the Philip Carey Mfg. Co., has been appointed sales manager for rubber and plastic presses of the Baldwin Southwark Division of the Baldwin Locomotive Works, Philadelphia, Penna.

R. B. BOGARDUS, assistant vice-president of the Rubber Development Corp., Washington, D. C., has been made a full vice-president in charge of Latin-American operations.

HARRY E. FOSTER, associated with the B. F. Goodrich Co., Akron, since 1917, has been appointed assistant secretary of the company and treasurer of the B. F. Goodrich Chemical Co., a subsidiary.

JOSEPH A. BURKE, who until recently was head of the textile division of the Hood Rubber Co., Watertown, Mass., has been named sales director of the coated fabrics division of Bristol Fabrics, Inc., Boston, Mass.

JOHN L. COLLYER, president of the B. F. Goodrich Co., Akron, and Special Director of Rubber Programs, has been named a member of the executive committee of the International Chamber of Commerce.

HERMAN D. RUE, formerly chemist of the Airlastic Rubber Co. and previously associated with the Dryden Rubber Co., both of Chicago, Ill., has been appointed chief chemist of the Golden State Rubber Mills, Los Angeles, Calif.

DR. CHARLES M. A. STINE, chemical director and a member of the executive committee of E. I. du Pont de Nemours & Co., Wilmington, Del., has retired from these positions after 17 years of service with the company. DR. STINE, who retains his positions as a vice-president and director, is credited with chief responsibility for the introduction of fundamental research in the Du Pont programs which led to the discovery of neoprene and nylon.

H. K. POHLMAN, of the National Motor Bearing Co., Inc., has been elected president and general manager of the Arrowhead Rubber Co., Vernon, Calif., succeeding H. FRANKLIN. Arrowhead is a wholly-owned subsidiary of National Motor Bearing.

EDWARD GAMMIE, manager of industrial sales of the Victor Manufacturing & Gasket Co., Chicago, Ill., has been appointed general sales manager of the company.

R. C. EVANS, formerly chief chemist of the Victor Products Corp., Gettysburg, Penna., has been named consulting chemist to the Florida Rubber Products Co., Miami, Florida, succeeding MICHAEL LEVIN.

H. E. HOUGHTON, vice-president and general sales manager of the Brown Co., has resigned to join the Muzak Corp.

COL. BRADLEY DEWEY, president of the Dewey and Almy Chemical Co., Cambridge, Mass., and former Rubber Director, received the honorary degree of Doctor of Laws from Harvard University on June 29.

ROBIN H. MCGLOHN, president of the Alto Tapajos Rubber Co. of Brazil, is currently visiting the United States to confer with officials of his company in New Orleans, La. His itinerary also includes Washington, D. C., and New York City.

A. D. ROSS FRASER, president of the Rome Cable Corp., Rome, N. Y., has been elected a vice-president of the National Association of Cost Accountants.

EDWARD M. MARTIN, of the International Division of the B. F. Goodrich Co., Akron, has returned to France to resume duties which were interrupted by the German occupation. During the early years of the war he served as assistant treasurer of Goodrich.

ROBERT PAAP, who has been engaged in sales work for S. C. Johnson & Son, Inc., Racine, Wis., since 1939, has been appointed merchandising manager of the company's Industrial Wax Division.

DR. T. L. GRESHAM, who has been associated with the B. F. Goodrich Co., Akron, since 1937, most recently as director of Koroseal and plastic research, has been named director of organic chemicals research, and DR. C. F. GIBBS, who joined the company in 1936, has been appointed director of polymerization research.

LT. COL. WILLIAM A. PETERSON, Executive Officer of the Procurement Division of the Philadelphia Quartermaster Depot, has been named Director of Supply, replacing COL. H. M. MANDERBACH.

V. E. OBER, who for the past 12 years has served as southeastern sales manager of the Mansfield Tire & Rubber Co., Mansfield, Ohio, has been appointed tire sales manager of the Inland Rubber Corp., Chicago, Ill.

WILLIAM F. LOWNDES, who has ha more than 15 years' experience in export work with a major automobile company, has been named managing director of Goodrich Svenska-Gummi A. B., with headquarters in Stockholm, Sweden.

WFA REPORTS TEST RESULTS ON SYNTHETIC SEALING RINGS

Based on a report of the War Food Administration indicating that synthetic rubber sealing rings are superior in quality to earlier products, the Rubber Manufacturers Association states that the new rings are expected to raise to an all-time high the 1945 food pack of the nation's $700,000,000 home canning industry. The WFA report set forth the results of exhaustive tests which were made at the Massachusetts State College.

In 1944, more than 24 million housewives in the home kitchen packing industry preserved approximately 3½ billion quarts of fruits and vegetables, according to the U. S. Department of Agriculture. The WFA studies were designed to put to critical tests for taste and sealing qualities the rings that these home-canners will use.

Findings reported by the testing committee under Dr. W. B. Esselen, Jr., of Massachusetts State College include:

1. That the rings available for home-canning in 1945 are definitely superior to those available in 1943, and are a further improvement over those on the market in 1944, which gave but little trouble.

2. That both red and black jar rings were equally good; the color of the jar ring has no relation to its quality.

3. That all rings in cartons have a characteristic odor which does not necessarily have a bearing on off-flavor in foods. For this reason people should not be advised to smell of the jar rings as a means of determining whether or not they will impart an off-flavor of foods.

Murrill and Price Honored

A testimonial dinner was tendered to Dr. P. I. Murrill and Gladding Price at the General Putnam Hotel in Norwalk, Conn., by the Rubber Department of the R. T. Vanderbilt Co. during the week of June 4 when a sales meeting of all Vanderbilt representatives was held. The dinner commemorated 25 years of continuous service with the company on the part of both men. Attractive, specially engraved wrist watches were presented to both Dr. Murrill and Mr. Price. The sales meeting was attended by 35 members of the Vanderbilt rubber department and was presided over by E. B. Curtis.

New Synthetic Specifications

A completely revised set of specifications for government synthetic rubbers, effective July 1, 1945, has been made available by the Rubber Reserve Co. Like previous specifications, it covers specification limits, sampling, chemical methods, and physical methods. An appendix lists suppliers of standard compounding ingredients. Copies of the new specifications may be secured from the Rubber Reserve Co., Washington 25, D. C.

Helium in Tires

Pneumatic tires on a forthcoming giant airliner will be filled with 26 pounds of helium instead of 180 pounds of air which would normally be required for the job, according to report. The weight saving of 154 pounds will increase the available payload of the craft by exactly that amount. Helium, being an inert gas that has no known chemical affinity for natural or synthetic rubber, is expected to provide an extra dividend in long tire life.

Actoflux for Butyl Compounds

Actoflux is the trade name given by the Caldwell Co., First Central Tower, Akron 8, Ohio, to a new series of synthetic resinous high molecular weight copolymers or condensates varying from hard, crystalline-fracturing resins to amorphous-fracturing waxes or even viscous pastes. Although compatible in varying amounts with GR-S, GR-M, butadiene-acrylonitrile rubber, natural rubber, Thiokol, vinyl resins, and other materials, it is especially recommended by the manufacturers for use in the compounding of GR-I (Butyl).

Actoflux acts as a retarder-activator for quinone dioxime (G.M.F.) cures and for combination quinone-dioxime-sulfur cures. It is said to permit the safe use of the speedy but scorchy G.M.F. compound in plant processing by retarding acceleration at processing temperatures but produces remarkably fast activation at curing temperatures. Safe processing inner tube forumlations, for example, can be made to cure in 5 or 6 minutes at 287° F. or less.

Actoflux is reported to increase the strength of raw Butyl stocks regardless of the type or cure or pigmentation, at the same time decreasing cold flow, creep and distortion under load or strain. The new material is also said to aid considerably in the dispersion of pigments, to reduce the temperature of Banbury mixing, to increase tubing speeds, to improve tear, and to act as a cure leveler, producing relatively constant hardness, tensile, modulus and elongation over a wide range of cures (4 to 60 minutes).

In general, the Actofluxes are essentially neutral compounds with specific gravities varying from 0.90 to 1.10, are extremely stable and do not contain or produce free acids or alkalies, are non-poisonous, non-toxic and free from dermatitis reaction, and are insoluble in hot or cold water.

Hospital expense benefits for dependents of employees insured under the group program of the Haartz-Mason-Grower Co., Watertown, Mass., have recently been included in the plan, according to an announcement by the Metropolitan Life Insurance Co.

JAP PROTECTIVE CLOTHING DECLARED OF HIGH QUALITY

The Japanese are far advanced in the manufacture of protective clothing, even to the point of being able to get adhesion between rubber and silk, according to John Anderson, manager of the cement and spreading department of the B. F. Goodrich Co., Akron, who examined and analyzed the materials of a Japanese decontamination outfit that was sent to a member of the firm from Iwo Jima.

The suit, which weighs about three pounds, is made of natural rubber and silk. Impermeable cellophane is placed between two plys of silk and adhered to the silk by means of a rubber compound. When moved or mashed, the suit makes a crackling noise. The glove is a three-fingered affair with a compartment for the thumb and trigger finger. The suit is far from comfortable, but has the flexibility of thin cardboard.

The workmanship indicates that it is probably a product of the Japanese home industries, since it is very crudely cemented and constructed, Mr. Anderson said. He surmised that children or inexperienced women workers cemented the suits together after they had been cut out from a master design. Although Mr. Anderson cautioned that Japanese equipment is not to be underestimated, he pointed out that American manufacturers have developed an even better and more usable suit from synthetic rubber and synthetic fiber.

Rubber-Coated Propeller Blades

Synthetic rubber may be the answer to a problem which has plagued the shipping industry for years—corrosion of ferrous propellers by electrolytic action of the salt water while ships are in motion, according to a report of the Goodyear Tire & Rubber Co., Akron. In experiments carried out by Goodyear, a ship propeller has been treated with a thin coating of synthetic rubber in the form of 27 coats of adhesive and of synthetic rubber cement. The adhesive and the cement were applied by brush with several hours being allowed to elapse between each application. A test propeller coated with the rubber film is now in service on a Liberty ship.

Firestone Tire & Rubber Co.

Six months Ended April 30: Net profit of $6,981,806 after deductions for depreciation, interest and $20,381,860 of domestic and foreign income and excess profits taxes and after provision of $3,500,000 for contingencies and renegotiation. This is equivalent to $3.08 a share on the common stock outstanding and compares with $6,626,652, or $2.88 a common share, reported for the corresponding period of the previous fiscal year, when $18,130,484 was provided for taxes and $2,500,000 for contingencies.

FISK TIRE PLANT EXPANSION TYPIFIES INDUSTRIAL DEVELOPMENT

Under the necessity of supplying increasing demands for truck and passenger tires, for both military and essential civilian transportation uses, the tire manufacturing industry has been expanding its facilities steadily for some two years. Typical of such efforts is the Fisk Tire plant of the United States Rubber Co. at Chicopee Falls, Mass., which was expanded and revamped by the Turner Construction Co., of New York City. A $2,900,000 project, which was completed in less than a year, the Fisk achievement is truly a construction saga.

The magnitude of the Fisk Tire contracts spelled only a small portion of the achievement. Apart from the necessary speed in getting the additional units into operation as fast as possible, Turner Construction was faced with a variety of hazards when work actually started in October, 1943. Winter weather was immediately ahead, labor was scarce, and vital materials were difficult to obtain. Progress schedules were set up giving no quarter to these difficulties and, through close coordination of all parts of the work, such schedules were maintained to a high degree. By July 1st all new buildings were completed.

In the preceding eight months the builders had accomplished a wide variety of construction tasks, ranging from the building of new roads and pavement to erection of a multi-story building and numerous alterations to existing structures to speed and increase tire output. Bridges were built between buildings; a conveyor was relocated; water, steam, sewer and electric services were installed or rerouted. The Turner organization stayed on until September to install, connect, and tune up the equipment.

Before any of this work could proceed, detailed architectural, structural and mechanical drawings had to be completed by Lockwood Greene Engineers, Inc. Soil conditions at Chicopee Falls posed another problem requiring construction, under separate contract with Raymond Concrete Pile Co., of 97 open caisson type foundations for support of columns and walls of the new buildings.

Moved Sprinkler Tank

Before the general excavation for the main building could be completed, a 100,000 gallon elevated sprinkler tank had to be moved and relocated. The tank was supported on a structural steel frame consisting of four steel columns 110 feet high. The method used in the moving operation saved considerable time and was most expedient. First, each leg of the tower was counterweighted with large bins filled with sand sufficiently heavy to counteract any tipping of the tank and tower due to wind pressure. These bins were supported by structural steel members, which also acted as struts or braces between the vertical legs. The tower was braced and guyed its entire height, and was then ready to be cut loose from the existing anchorage.

Jacks were used for raising the tower and tank vertical so that each leg could be placed on two sets of four-wheel "dollies." Each dolly had flange wheels for travelling on regular steel rails. Tracks were then laid from the original location to the new one and the whole structure moved along this track approximately 700'. At the new location the structure was taken off the dollies and lowered to the new foundations, previously prepared.

Late in October, Turner Construction started field operation, preparing forms and doing the excavating for the new five story reinforced concrete building, known as No. 42. This building is 351 feet long and 164 feet wide, including the loading platforms on the east and west side. It was designed particularly to carry the extra heavy floor loads due to the Banbury mixers and the rubber mills which are located on the second and third floors. These floors are of reinforced concrete, and of a flat slab design for 350 pounds per square foot allowable live load.

In order to set the machines properly, recesses were left in the slabs so that the machines could be operated from finished floor levels and not from platforms or steps. Due to the recesses in the floor slabs the supporting bands for the flat slab construction at the columns were 30 inches thick. After the rubber mills were set in place concrete fill was then used in the recesses to bring the floor around the machines to the level of the main floor. The supporting slab under the machines was 18 inches thick, which was depressed 12 inches to form the recesses. The fourth and fifth floors were designed for 250 pounds live load, and were of the flat slab design, with slabs 11½ inches thick. The finished floor on these floors was of wood block construction.

The first concrete was poured on November 18, 1943, and in nine weeks the second, third, fourth and fifth floor and roof slabs had been completely poured, together with the supporting columns and spandrel beams. The brick walls and the steel sash followed closely so that the building could be enclosed as quickly as possible, rendering the floors ready to receive the mechanical equipment. This work was all done during the winter months and winter weather protection, consisting of a wooden frame with tarpaulin covering housing coke-fired open stoves or salamanders, was made to protect each floor as it was poured. This work was accomplished at a cost of $37,900. Due to both the speed required in completing the construction work and that of securing sufficient labor the total overtime cost amounted to $79,990.

Another interesting feature was the problem of keeping the railroad siding to the new building in operating condition so that it could serve the adjoining existing buildings during construction. This necessitated the use of steel piling and the pouring of a reinforced concrete retaining wall in a very limited space. This wall formed the exterior wall of the new building below grade and supported the loading platform. There is also a tunnel under these tracks between the new and the existing buildings. The tracks had to be shored properly and protected while this work was in progress.

The foundations for the very heavy pieces of machinery, weighing 75 tons, had to be investigated very carefully and were laid out with extreme care so the holes for anchor bolts and piping sleeves would be in the correct position in the rough slab. The machines could then be set in perfect alignment.

Due to the fast construction schedule a coordinated effort had to be made in order that the materials and equipment would arrive on the job when needed. This called for close scheduling of all shipments, the tracing of all cars and the expediting of deliveries. According to the schedule the first floor was to be ready to receive machines January 1, 1944; and the second and third floors were to be ready to receive machines February 1, 1944; the fourth and fifth floors were to be ready March 1, 1944. These dates were substantially met, and the first machine arrived on the job January 8. From that date on, machinery was erected as soon as it arrived on the site. On April 10, 1944, the main building was substantially complete and a large number of machines were being installed by this time.

Cement Building Vapor Sealed

Building No. 43, a rubber cement manufacturing building, was of unique design in that it was entirely vapor sealed on the inside and had explosion panels in the walls and in the roof. This single story building is 111 feet long and 50 feet wide, with masonry walls and structural steel truss roof supports. The roof slab, which was of precast concrete plank, was designed to resist an upward pressure of 45 pounds per square foot, and for relief had hinged panels which would act as vents in case of an internal explosion. The windows and doors were double glazed, and the entire interior of the building humidified so that the correct degree of moisture is present to prevent explosive gases forming.

This humidifying is controlled automatically and the air changes are controlled by the exhaust and fresh air systems. The equipment installed consisted of large kettles, pumps and piping used in the manufacture of rubber cement. This building was of extreme importance in the scheme of the manufacture of synthetic tires, but due to the intricate design was not started until February 14, 1944, and was finished and in operation July 4, 1944.

A Certificate of Service award has been made to the U. S. Rubber plant at Detroit, in recognition of meritorious service rendered by the plant in the training of maintenance and repair technicians for the Air Forces.

Tuley Back with Naugatuck

Dr. William F. Tuley, who has been serving as plant manager of the Kankakee Ordnance Works, Joliet, Ill., operated by the U. S. Rubber Co., since April, 1942, has rejoined the Naugatuck Chemical Division of the company as assistant general sales manager. Dr. Tuley was born in Palmyra, Mo. He was graduated from Oregon State College with a B.S. degree and received his Ph.D. in organic chemistry from the University of Illinois in 1926. After two years with another company as a research chemist, he joined the general laboratories of U. S. Rubber at Passaic, N. J. Later, he was transferred to the laboratories at Naugatuck, Conn. In 1939 he was made assistant sales manager and subsequently became sales manager for rubber chemicals and reclaim.

Dual Tires for Airplanes

Dual tires for airplanes, which have been given a boost by their successful use on the famous B-29's, are likely to become the dominant fashion for the larger varieties of aircraft, according to tire experts of the B. F. Goodrich Co., Akron. Studies on the performance of duals on aircraft indicate that they should be favored for air use. Included among reasons given for the preference of duals were the following: Duals provide greater security against the hazards of flats in landings and take-offs; there is less chance of damage to the plane in the event of a blowout when the wheel is retracted; and there is lower tire and tube cost.

PT Boats Use Fuel Cells

Self-sealing fuel cells, which have long been used in airplanes, are also being employed in Navy PT boats, according to the B. F. Goodrich Co., Akron. Accelerometer tests made after a hurricane off the Florida coast in November, 1942, showed that for this use the cells would have to withstand an acceleration, or change of velocity, 20 times as great as the acceleration of gravity. Goodrich thereupon developed such a cell, which was tested under combat conditions the following May. The Navy subsequently adopted the cell for its PT boats, each of which is now equipped with four of the cells.

Booklets Still Available

United Carbon Co., Inc., Charleston, West Virginia, advises that although requests for copies of its new booklet, entitled "Developments and Status of Carbon Black," have been most satisfactory, some copies are still available for limited distribution. As indicated by its title, the booklet is a comprehensive review of the carbon black industry from the standpoints of manufacture and use. Requests for copies should be made on company letterheads.

LeBras Visiting United States

Jean LeBras

Jean N. LeBras, director of research of L'Institute Francais du Caoutchouc (the French Rubber Institute), is currently in the United States and is attached to the French Supply Mission at Washington, D. C. He was sent to this country by the French Government to study the progress made in rubber technology and laboratory equipment. According to Mr. LeBras, the French Rubber Institute has continued its activities in rubber research in the past few years, despite German occupation and many material difficulties. Technical courses covering both rubber cultivation and manufacture have been given at the Institute since 1941. The Institute is also the current publisher of *La Revue Generale du Caoutchouc*. Mr. LeBras intends to visit various rubber plants and laboratories during his stay in this country and looks forward to renewing relations with his many friends.

N. Y. Sets Meeting Dates

The Executive Committee of the New York Rubber Group, meeting in New York on July 11, approved dates for three meetings to be held during the balance of the current year. Regular meetings will be held on Friday, September 21, and Friday, November 2, and the annual Christmas party will be held on Friday, December 14. As usual, the meetings will be held at the Building Trades Club, 2 Park Avenue, New York City.

To Operate Nevada Plant

The Stauffer Chemical Co., New York City, has taken over the operation of the chlorine-caustic soda plant of Basic Magnesium, Inc., in Las Vegas, Nevada, one of the largest and most modern plants of its type in the country. The plant will continue to manufacture chlorine and caustic soda, which Stauffer will sell to industries throughout the country.

Acquit Cartel Case Defendants

A Federal Court jury, sitting in Newark, N. J., on June 20 acquitted E. I. du Pont de Nemours & Co., the Rohm & Haas Co., and six officials of those companies charged with consipracy to violate the Sherman Anti-Trust Law. The specific indictment charged the defendants with conspiring with I. G. Farbenindustrie and the Rohm & Haas Co., both of Germany, and Imperial Chemical Industries, Ltd., of London, to monopolize production, allocate sales territory throughout the world and fix prices for acrylic products. Two counts of the indictment, charging monopoly and conspiracy to monopolize, were dismissed at the instance of the prosecution before the case opened. A separate indictment concerning monopoly and restraint of trade in the denture field was also quashed.

Goodrich Develops Strato-Suit

Experimental development of a new flexible, pressurized Strato-Suit, which has proved practical in pressure-chamber tests equivalent to 80,000 feet, or 15 miles, above the earth's surface, has been revealed by the B. F. Goodrich Co., Akron. Made of rubberized fabric, the suit is flexible enough even when pressurized to allow all needed freedom of movement. It can be donned in two minutes, owing to the use of new airtight and watertight zipper closures, and it has a transparent plastic "bubble" head-piece which can be removed in less than one second. The suit, when fully pressurized, surrounds the flyer with four pounds of air pressure. It is equipped with a junction assembly which provides oxygen, microphone and earphones, and electricity for heated underwear.

Name New Black Rock Officers

Several changes in the organization of the Black Rock Mfg. Co., manufacturers of rubber cutting and other equipment of Bridgeport, Conn., were recently announced. Ira S. Pace is president and treasurer; Joseph R. Keller, vice-president; Edward J. McCarthy, secretary; and John Friedlander, purchasing agent. The directors now include Messrs. Pace, Keller and McCarthy, and John E. Holloway and G. L. Hammond. D. H. Aker continues as sales engineer.

Opens Temporary Plant

The U. S. Rubber Co. has opened a new temporary plant in Berlin, N. H., for the production of "Mae West" life vests needed by the Navy in increasing quantities. The new facilities will augment the output of vests at the Providence, R. I., and Manchester, N. H., plants, where labor shortages have handicapped operations. Company officials declare that they have no plans at the present time for establishing a permanent plant in Berlin.

LOS ANGELES NEWS

The big event of the month is to be the scheduled Spanish Fiesta, the annual summer outing of the Los Angeles Rubber Group, July 21 and 22, at the Uplifters Club in Santa Monica. An attendance of 125 members and friends is slated.

A vast array of events are on the program and prizes have been secured in sufficient number and for a sufficient list of events so that everyone attending is pretty well assured of winning something. Games of all kinds—horseshoe pitching, archery, swimming, etc.—are included, the thought being to provide for everyone an entertainment feature in keeping with his tastes and talents.

United States money is to be changed into Mexican money to give an additional touch of realism to the big event. Everyone is charged wtih the sacred duty of attending in costume. Motion pictures will be taken by the Group's photographer and shown at Fall meetings of the club. This has been a feature for some years.

Dancers will appear from the Raoul Ramires Dance Studio under the direction of a prominent Spanish dance instructor. He has furnished many of the stars for studio work, particularly Walt Disney's Three Caballeros.

A prominent breakfast speaker has been secured. His name is not announced in the publicity sent out in advance but the boys can guess rather closely perhaps from a cartoon drawing of the gentleman appearing on the advance pamphlet sent out.

As has been the custom the guests will arrive at the Club at 1:00 P.M. Saturday, (July 21) and remain until 4:30 P.M. Sunday. Supper, breakfast, and lunches are always included in the food schedule.

This type of event was substituted when the war broke out for the deep sea fishing event of past years. It has proved very popular. Each year a theme is selected and followed out throughout the two days.

Various committees have been at work arranging the program and securing prizes as well as perfecting the transportation schedules. R. E. Hutchinson (Firestone) is chairman this year of the Los Angeles Rubber Group and he with others has taken a keen interest in planning the Fiesta, the thought being to top past events both in enthusiasm and variety. This is regarded as a big job, for all past events have been record breakers.

Walter E. Head, who has been plant manager for the B. F. Goodrich Company in Los Angeles for the last six years, has been named production manager of pneumatic tires at the main plant in Akron. Mr. Head went on duty there July 1. He has been with the company for twenty years. In Los Angeles, B. W. Perdriau, who has been production superintendent, becomes acting plant manager. He has been wtih the Los Angeles plant about 1½ years.

The Foreman's Club of Goodyear held its regular party recently at Carl's Restaurant, Los Angeles. The event was well attended and an entertainment program provided.

Special guests of honor at the 25th Anniversary celebration at Goodyear on June 14 were the employees who were there in 1920 when the plant opened. E. J. Thomas, president of Goodyear, himself at one time connected with California-Goodyear, and considered one of America's leading industrialists, gave the address at the silver anniversary dinner held at the Biltmore Hotel. P. W. Litchfield, chairman of the board of directors, sent greetings. D. W. Sanford was chairman of the reunion dinner committee. The big event was also celebrated with a special edition of the local paper, the *Wingfoot Clan*.

Ground was broken for the Los Angeles plant on July 21, 1919, with P. W. Litchfield, then factory manager of the parent plant, forcing the shovel into the ground that turned the first sod, and F. A. Seiberling, then president, driving a pick into the ground at the same moment. The site of the plant at that time was a cabbage patch considered pretty well out in the country. Today with the growth of the city the plant seems to be quite in the midst of things. The plant was one of the first major plants of any kind to locate in what is now the rather extensive industrial area of Los Angeles.

Dave Good, is now foreman of the service department in the synthetic division of U.S. Rubber, going from the tire plant.

War training courses given at U.S.C. were concluded on June 19. Vic Vodra (Vanderbilt) gave a 16-weeks course in compounding of synthetics, while Fred Woerner gave a course of similar length in rubber chemistry and technology.

William E. Roake, a nephew of W. E. Hutchinson, who is chairman of the Los Angeles Rubber Group, is at the California Institute of Technology in Pasadena in connection with a government project. The young man came to Pasadena from the Northwestern University in Evanston, Illinois.

Dr. R. V. Yohe, vice-president of American Anode, Inc., Akron, Ohio, recently spent eight days in Los Angeles.

Paul Shoaf, who has been manager of Goodyear Synthetics, has been transferred to the Akron plant and is in the crude rubber division. Jack Lockridge took his place in Los Angeles.

John Ingle, formerly director of Goodyear plantations in Sumatra, is now busy developing his ranch at Escondito, California.

B. E. Dougherty, of the B. E. Dougherty Company, took a business trip east this summer but is now back on duty in Los Angeles.

H. H. Hummer (Firestone) left Friday, July 6, for Akron on a two weeks business trip.

A patent (No. *2,329,242*) covering a rubber drain plug with an integral sharp-edged handle on the side and a lengthened lower portion which acts as a plunger upon removal of the plug has been made available for licensing or sale, according to an announcement of the Official Gazette of the U. S. Bureau of Patents.

A 72-page catalogue of the books, publications and patents which have resulted from fifteen years of fundamental and applied Battelle research has recently been published by Battelle Memorial Institute, Columbus, Ohio. The catalogue lists more than 800 such publications, including articles, books and patents, between the years 1929-1944, inclusive. Subjects in the fields of organic chemistry, electrochemistry, chemical engineering, etc., are covered.

Monsanto has announced that it will construct a $450,000 unit for the production of Santocel, said to be one of the strangest and most versatile chemical products to be developed in the last generation, at its Merrimac Division plant just outside Boston, Mass. It is expected that the new facility will be operating at full capacity by the end of the year.

Goodrich has announced that it will continue as a distributor of Thor products manufactured by the Hurley Machine Division of the Electric Household Utilities Corp. The Thor line will be distributed by Goodrich through an approved group of stores and dealers who have met the requirements of location, available space, and merchandising organization.

NEWS IN BRIEF

The Army Engineering Corps has selected glass cloth, woven of glass fiber yarns and coated with either neoprene or vinyl compounds, for curtains, side walls and ends in newly developed airplane hangars installed at advance AAF bases.

Goodyear has appointed the United States Plywood Corp., New York City, as exclusive nation-wide sales agent for Pliobond, its all-purpose synthetic adhesive cement.

A number of fun-making suggestions for bicycle riders are presented in a booklet entitled "Fun with your Bike," published by the Pharis Tire & Rubber Co., Newark, Ohio.

A broadside outlining some of the many potential post-war applications of its recently-announced pressure sealing zipper, has been issued by Goodrich.

Synthetic rubber truck tire performance is averaging around 70% of that of pre-war natural rubber tires, according to a nation-wide survey recently conducted by field engineers of U.S. Rubber.

A new engine mount for use in B-29 Superfortresses, which is said to save approximately 36 pounds per airplane, or almost one and one-half pounds per mount over types currently in use, has been announced by Goodyear.

Monsanto has developed and placed in production a new series of casting sealants which, it is said, will free the United States from dependency on foreign-produced tung oil for impregnation of aluminum and magnesium airplane parts. The new sealants are thermosetting solutions, a mixture of base resin and styrene monomer.

Expansion of plant facilities and consolidation of sales offices have been accomplished by the Rucker-Vaughn Co. in their Oakland, Calif., location. The company manufactures the Vaugh line of pressure regulating valves and gas and oil burning equipment, as well as the Arnold Lubricator, an air tool specialty.

U. S. Rubber has disclosed that it has produced some 36,000,000 rubber heels for the armed forces since Pearl Harbor. The company has also announced that it has developed a satisfactory tan heel for tan shoes from synthetic rubber, which is now in production.

A special type of one-inch water hose designed to resist the actinic rays of sunlight and damage from kinking and from extremely low temperatures has been perfected by Goodyear.

The April issue of *Weather Magic*, house organ of the Trane Co., La Crosse, Wis., features a story on the National Synthetic Rubber Corp., Louisville, Kentucky.

Technical advances in tropicalization are set forth in a circular entitled "More About Your Needs for Tropicalized Wax," issued by Zophar Mills, Inc., 112 26th St., Brooklyn 32, N. Y.

A reproduction of a talk entitled "Is Synthetic Rubber Just a Wartime Baby?" given by F. B. Davis, Jr., chairman of the board of U. S. Rubber, before the Economic Club of Detroit, Mich., on January 29, has been issued by the company.

A plaque containing the 50-millionth tennis ball made by the Pennsylvania Rubber Co., was recently awarded to Pauline Betz, national women's singles champion.

Ground has been broken at the Attica, Ohio, plant of the Pioneer Rubber Co., for a new building which will be devoted to the manufacture of industrial and household rubber gloves.

The Pharis Tire & Rubber Co., Newark, Ohio, has entered the automotive equipment field and has received an initial order from the Army for brake linings for jeeps.

Guaranteed Products, 1117 Crenshaw Blvd., Los Angeles, Calif., has developed Rubbermastic Paint, a rubber base paint which the company claims can be applied to any surface without etching or other preparation.

"Care and Use of Synthetic Rubber Tires" is the title of a booklet recently issued by the Office of Defense Transportation, Washington, D. C., which discusses tire use and maintenance practices that have the greatest effect on tire casing life. Copies of the booklet may be obtained by writing to ODT.

U. S. Rubber has developed a new type of synthetic rubber to seal brass shell cases to steel projectiles in the manufacture of 40 mm. ammunition.

The E. Louis Metzger Co., distributors of industrial rubber goods, has moved to new quarters at 220 S. Sixteenth St., Philadelphia 2, Penna.

Damask linen tablecloths that cannot be stained by gravy and brightly-colored draperies that can be wiped clean with a damp cloth are among the post-war developments foreseen by Monsanto for its vinyl butyrals.

Hose Production Method

The development of a new method of manufacturing rotary hose which gives the hose increased strength and flexibility has been announced by the U. S. Rubber Co. The key to the new technique—called Unitension—is a special machine designed by the company's engineers which winds the main pressure-resisting wires around the rubber and fabric carcass at a scientifically determined angle. By controlling the tension on each individual wire during this operation, the tension on all wires in all plies throughout the hose is equalized, and placement of the wires is uniform. In laboratory and field tests this hose was found to have greater strength and increased flexibility.

Naugahyde Plastic Upholstery

A new line of plastic upholstery, known as "Naugahyde," which is both waterproof and flameproof, has been announced by the U. S. Rubber Co. Advantages claimed for the new product are that it is unaffected by salt water, alcohol, gasoline, oils, greases, most acids and alkalis; that it is highly flexible and easy to tailor; and that it will not get hard or crack and will resist edge-wear, abrasion, scuffing, flexing and wrinkling. It will be manufactured in a wide range of light and bright, clear decorative colors and is recommended for use in furniture, open cars, boats, theatre seats, railroads, airplanes, etc. Naugahyde upholstery has been adopted by the Navy as mandatory for all Navy combat ships.

Pharis Borrows $1,500,000

The Pharis Tire & Rubber Co., Newark, Ohio, is reported to have completed arrangements for a bank loan of $1,500,000, secured by a 10-year note at 3¼%, with the Society for Savings, Cleveland, Ohio. Of the proceeds, $1,000,000 will be used to pay off an outstanding loan at 4% made by an insurance company, while the remaining $500,000 is to be allocated to the operation of the company's new truck tire plant at Newark, which is being built with Defense Plant Corporation funds at a cost of approximately $2,250,000.

Swan Rubber Plans Expansion

The Swan Rubber Co., Bucyrus, Ohio, producers of mechanical goods, recently announced the purchase of an additional 40 acres of land in Bucyrus. Although the company is planning to expand in the near future, no definite building program has been announced.

E. S. NICKERSON, assistant manager of the Fabrics Division of the Fabrics and Finishes Department, E. I. du Pont de Nemours & Co., Inc., has been appointed assistant general manager of the department.

CANADIAN NEWS

The Rubber Association of Canada at its annual meeting held on June 14 in Toronto elected P. C. Jones (Dominion Rubber) as president; F. A. Warren (Gutta Percha & Rubber), vice-president; and R. J. Thomas (Seiberling Rubber), treasurer. Directors elected included W. H. Funston (Firestone), H. S. Ireland (Canadian General Rubber), W. H. Miner (Miner Rubber), A. G. Partridge (Goodyear), G. W. Sawin (Goodrich), and J. I. Simpson (Dunlop). G. B. Smith was reappointed secretary and general manager.

A Defence Headquarters release tells of the tire maintenance plan used by the Canadian Army and says that all knowledge gained during the war years will be made available to the motoring public. Many of the larger transportation companies have already patterned their tire maintenance schedules on the system used by the Army, a system that is saving the Dominion "thousands upon thousands of dollars" yearly in addition to conserving rubber.

Experiments carried out by the Ordnance Branch in the application of synthetic rubber, and its use in prolonging the life of tires on both light and heavy-duty army vehicles, has brought to a high degree of perfection the system of recapping. Although the system of recapping was limited in use in Canada prior to the war, it was introduced generally by the army to combat the critical rubber situation of the war years. Civilian concerns immediately showed interest and recapping procedure, based on Army specifications, is now available to motorists in the majority of the larger centers.

The Dow Chemical Co. of Canada will shortly begin the construction of a new factory for the production of styrene molding powders in Canada. The factory will be located adjacent to the synthetic rubber plant operated by the Polymer Corporation at Sarnia, Ontario, from which it will draw its supply of raw materials. Contract arrangements call for the sale by the Polymer Corporation to Dow Chemical of a minimum of 500,000 pounds a month of styrene. In addition, the crown-owned company will sell steam and treated water to Dow and delivery will begin as soon as the new plant is completed. Exact cost of the new plant has not been mentioned, but one statement indicated it would cost several hundreds of thousands of dollars.

No general answer to the question of how good are synthetic rubbers can be given, according to an address made last month in Toronto by Dr. A. W. Bull of the development department of the U. S. Rubber Co., Detroit, Mich., before the Industrial and Scientific Research Conference of the Canadian Manfacturers' Association. Pointing out that various synthetics have special individual advantages, Dr. Bull stated that so far no single synthetic has the all-around advantages of natural rubber. During the course of his address, Dr. Bull predicted that after the war we will not see an immediate and complete return to natural rubber "for a number of reasons."

Twenty-eight active and eight pensioned employees of the Miner Rubber Co., Ltd., who had seen thirty years or more of unbroken service with the company, were entertained on June 8 at a dinner in the Windsor Hotel, Granby. In welcoming the guests of honor, W. H. Miner, president, thanked them for their continuous loyal service over such a long period and stated that the awards they were to receive were further development of the company's policy of expressing its appreciation of their service in a practical way. The awards consisted of 30-year service buttons and $300.00 for each employee. Other speakers at the dinner included T. Y. O'Neill, general sales manager; F. H. Maranda, Quebec branch manager; N. A. Austin, factory manager; and R. R. Macaulay, former secretary-treasurer, now retired.

Directors of the Goodyear Tire & Rubber Co. of Canada, Ltd., on June 7 declared the regular quarterly dividend of 63c per share on the common stock and 62½c a share on the preferred, both payable on July 3 to stockholders on record June 15.

Charles R. Cornell, of the advertising department of the Dominion Rubber Co., Ltd., was elected president of the Foremen's Club of Montreal at the recent annual meeting of that organization.

Sales of the Canadian Tire Corporation for 1944 increased approximately 15% over those for 1943. Net profit was $142,566, compared with $127,317. It is not anticipated that earnings will show much variation until there is some easing of wartime restrictions in connection with the manufacture of merchandise, an increase in the allotment of gasoline, and reduction in taxation.

The financial position is stronger today than at any time in company history, J. W. Billes, president, states, and plans are well advanced to enable resumption of a more active program immediately after the end of hostilities. With the payment on December 1, 1944, of a dividend of 20 cents a share the company instituted what it hopes will be a regular quarterly dividend at this rate.

Apart from self-sealing gasoline tanks and a few strictly Government orders for war supplies, which are tapering off, the plants of the Goodyear Tire & Rubber Company of Canada continue at full capacity, with a good backlog of orders, A. G. Partridge, president, reports. Mr. Partridge holds out little hope for relief for several months for civilian users of tires and states that tires, except for military and essential business purposes, are still in short supply. Care of present equipment on cars and trucks is still most essential, he concludes.

There is no possibility of relinquishing restrictions on automobile tires for non-essential users, the Wartime Prices and Trade Board has declared in a statement. It had been rumored that there might be an early let-up of rationing. "Things look about the same as ever and it is hard to say what the future will bring," the board's statement said.

The recently Government-conducted vote in the Dominion Textile Company plant at Kitchener, Ontario, resulted in over 90 per cent of the employees voting the United Rubber Workers of America, as bargaining agents, William England of the field staff of the United Rubber Workers of America reports.

A.S.T.M. Acts on Standards

At its 48th Annual Meeting, held in New York City on June 27 this year because of wartime conditions, a one-session business meeting instead of the full five-day meetings customarily held, the American Society for Testing Materials authorized the adoption as formal standards of some 35 tentative standards and approved about 40 revisions in existing standards. Among new specifications adopted as standard were methods for identifying synthetic elastomers and a standard practice for conditioning rubber and plastic materials for low-temperature testing. J. R. Townsend, materials engineer of the Bell Telephone Laboratories, Inc., is the new president of the Society.

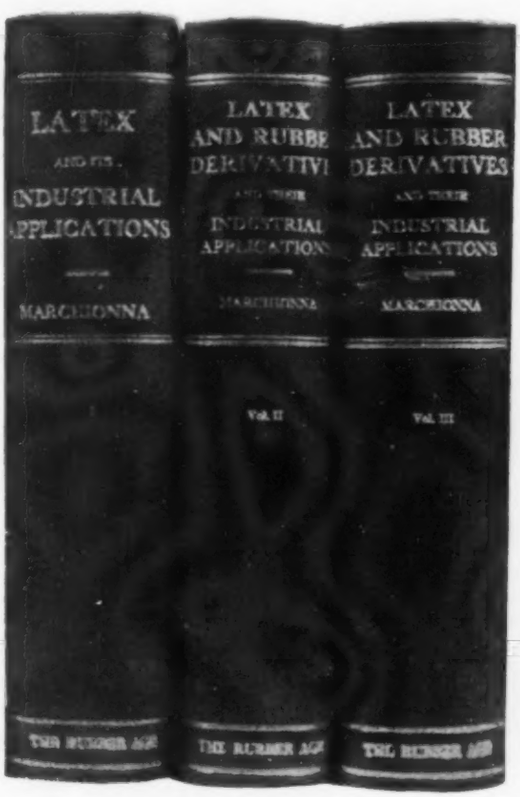
Moore Heads New Inland Plant

William A. Moore, formerly vice-president and general manager of the Armstrong Tire & Rubber Co., Natchez, Miss., has been named manager of the new tire plant which the Inland Rubber Corp. of Chicago is building at Ottawa, Ill. A figure in the rubber manufacturing field for many years, Mr. Moore was previously associated with Monsanto Chemical Co. and prior to that was an instructor in chemistry at the University of Akron.

LATEX & Its Industrial Applications (Vol. I)
LATEX & RUBBER DERIVATIVES (Vols. II & III)
& Their Industrial Applications.

●

By FREDERICK MARCHIONNA



VOL. I—1061 pages—11 chapters. Covers period through June, 1932.

VOLS. II & III—1670 pages—22 chapters. Cover period from July, 1932, through January, 1937.

6 x 9 in.—Completely Indexed

PRICES

Vol. I	**$15.00**
Vols. II & III (not sold separately)	**$20.00**
Vols. I, II & III (Combination Price)	**$30.00**

The only available *complete* BIBLIOGRAPHY of Patents and Literature on Latex and Rubber Derivatives. Contains abstracts of every Domestic and Foreign patent and published article through January, 1937 — a total of over 6,500 abstracts covering every phase of the use of latex and derivatives in all industrial fields. Supplemented by introductions to each chapter by the author or other leading authorities.

A FEW COMMENTS

"Abstracts are of comprehensive and meritorious character."
INDIA RUBBER WORLD

"Saves time and trouble for anyone interested in rubber science and industry."
RUBBER AGE, London

"Of great aid to people working in the latex and rubber derivative field."
INDUSTRIAL & ENGINEERING CHEMISTRY

"Invaluable source of reference."
BULLETIN OF RUBBER GROWERS' ASSN.

Every owner of Noble's, Hauser's, Flint's, Stevens' or Genin's books on latex should also have a complete set of Marchionna's Bibliography for handy reference.

●

Published by

THE RUBBER AGE
250 West 57th St. New York 19, N. Y.

OBITUARIES

Frederick C. Renner

Frederick C. Renner, general manager of sales of the Organic Chemicals Division of Monsanto Chemical Co., St. Louis, Mo., died on June 26 in Deaconess Hospital, St. Louis, after an illness of six months. He was 44 years old. Born in Germany, Mr. Renner immigrated to the United States as a boy. In 1922 he was graduated from Washington University with a B.S. degree. After teaching for a year at Washington University, he joined Monsanto's St. Louis sales staff in 1924, subsequently serving in several of the company's branch offices. In 1941 he became assistant general sales manager of the Organic Chemicals Division, and in 1943 he was promoted to general manager of sales. Mr. Renner was a Mason and a member of the University Club, the Bellerive Country Club, Sigma Xi, and Alpha Chi Sigma. He is survived by a widow, a son, and a daughter.

Allan V. Ritchie

Allan V. Ritchie, superintendent of the research laboratories of the Texas Company at Beacon, N. Y., for the past fourteen years, died of a heart attack in the New York City offices of the company on June 19. He was 59 years old. In recent months Mr. Ritchie was busily engaged in installing a complete rubber laboratory for the company at Beacon. Born in Grafton, N. D., Mr. Ritchie was graduated from the University of North Dakota in 1910. After teaching in high schools for about 10 years he joined the Texas Company in 1923. He began as a chemist, became a treater foreman, and in 1928 was made an engineering chemist in the technical division. In 1931 he was named superintendent of the Beacon laboratories. Mr. Ritchie was a member of the A.C.S., A.P.I., A.P.S., and similar organizations. A widow survives.

Lt. Harry L. Derby, Jr.

Lt. Harry Leigh Derby, Jr., U.S.N.R., has been killed in action in the Pacific, according to a Navy Department telegram received by his parents, Mr. and Mrs. H. L. Derby, of Montclair, N. J. No further details were given. Lt. Derby was 38 years old. Before volunteering for Navy duty in 1942, Lt. Derby was western sales manager of the American Cyanamid & Chemical Corp., in Chicago, Ill. Besides his parents, he is survived by a widow, two daughters and a son.

U.R.W.A. Convention Delayed

The annual convention of the United Rubber Workers of America (C.I.O.), which was scheduled to be held in Chicago, Ill., the week of September 16, has been postponed owing to restrictions on travel imposed by the Office of Defense Transportation. Delegates from 60 unions from the eastern seaboard alone would have to travel westward to the convention, and the union was informed that the present heavy redeployment of troops made the travel situation unfavorable. However, officials have not yet given up hope of holding a convention, which, they say, will take place within 60 days after restrictions have been lifted.

General Cable Redeems Bonds

The board of directors of the General Cable Corp., meeting in New York City on May 15, voted to redeem all outstanding first mortgage 3½% bonds on July 16, at a cost of $3,054,000. The company has no other funded debt. It has reduced its V-T credit from an original $25,000,000 to $9,000,000, and to date has not made use of this credit.

Introduce Metalam No. 140

Metalam No. 140, a new packaging material for the moisture protection of airplane engines and replacement parts, has been announced by the Goodyear Tire & Rubber Co., Akron. The new material consists of aluminum foil laminated on both sides with Vitafilm, the vinyl resin film recently developed by the company. Like Pliofilm, Metalam No. 140 is easily and quickly sealed with heat. It protects engines and replacement parts for as long as nine months when coupled with the moisture-absorbent properties of silica gel, also placed in each newly-wrapped engine.

Columbian to Split Stock

At a meeting held in New York City on May 13, directors of the Columbian Carbon Co. voted a three-for-one split-up of the capital stock, effective September 21, to stockholders of record of September 11. Of 2,000,000 authorized shares, there are now 537,406 of no par value outstanding, valued on the company's books at $21,849,354. The split-up will involve no change in stated capital or surplus of the company.

Rubber Springs in Buses

B. F. Goodrich Co., Akron, is now in production on Torsilastic springs for equipping approximately 1,000 Twin Coach buses during the current year. The Torsilastic spring, which has long been used on military vehicles, has been given a 125,000-mile test on buses with highly satisfactory results and has been experimentally applied to passenger automobiles with similar success. After the war it is expected to be applied to such non-vehicular uses as swivel chairs, porch swings, built-in ironing boards, truck tail gates, etc. An exceedingly simple device, the Torsilastic spring is completely different from conventional springs of either steel or rubber. As described previously, it consists of a steel outer shell and central shaft, with the space between shell wall and shaft filled with rubber, firmly bonded to the metal. The cylinder is held in fixed position on the axle, while an arm connects the shaft to the vehicle frame. All the springing is accomplished simply by the twisting movement in the rubber, or vice versa. Goodrich has made upwards of a half-million Torsilastic springs for amphibious craft, each spring strong enough to support a small automobile by itself.

Fuzon-O Coating Material

Fuzon-O, a formulated vinyl resin dispersion containing plasticizers, has been introduced by Stanley Chemical Co., East Berlin, Conn. Advantages claimed for the new coating material are that it permits high coating speed with freedom from pinholing or entrapped solvent problems even in heavy applications, and that several ounces of dry weight per coat can be deposited without the usual coating difficulties. It is recommended for coating a wide variety of fabrics and for use in the production of cast or unsupported films. Specific applications include fabrics for raincoats, ponchos, baby pants and protective clothing, fabric shoe materials, fabrics or glass cloth used in coating cable or wire sleeving, belting, upholstery, and automobile and aircraft cushion materials.

Improved Cotton Tire Cords

Wartime research projects on cotton at the Southern Regional Research Laboratory have resulted in developments that will find important peacetime applications, according to officials of the U. S. Department of Agriculture's research administration. Among the results of research to develop an improved cotton tire cord are a cord with improved heat resistance, and another with greater tensile strength than is obtained with present commercial cotton tire cords processes. The investigators declare without qualification that cotton cords can be manufactured which are definitely superior to the types of commercial cotton cords now being produced, and further improve ments can be expected as more informa tion is obtained and applied.

Illustration of Ball-Band rubber courtesy of Mishawaka Rubber & Woolen Mfg. Co., Mishawaka, Ind.

FOR POST-WAR RUBBER PRODUCTS

FULL COLOR DECORATIONS and NAME PLATES

MEYERCORD

Elasti-Cals

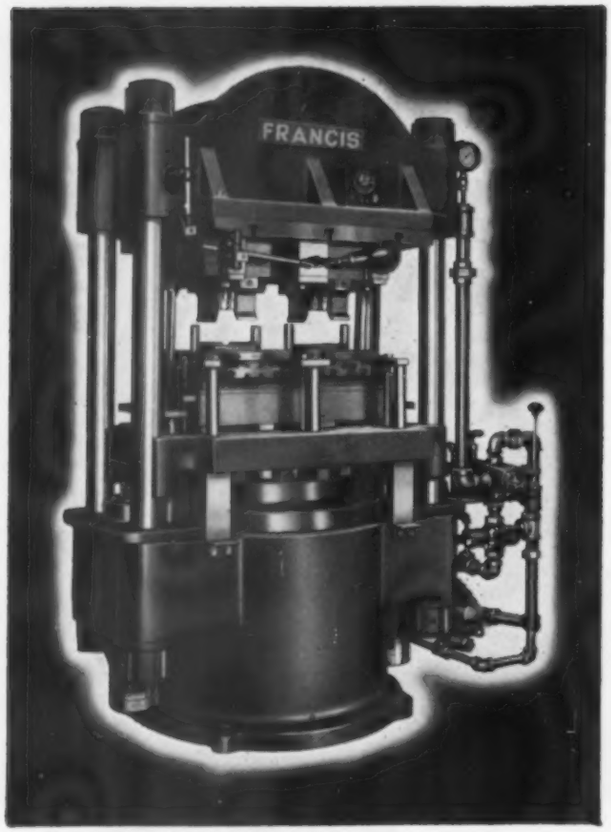
DECORATIVE•DURABLE•AND THEY

S-T-R-E-T-C-H

Elasti-Cal identification and decoration will step up the competitive position of your postwar men and women's footwear! Investigate their use on novelties, sporting goods, sundries and heavy rubber products, too. Elasti-Cals can be quickly applied in hot mold or cold and become an edgeless, smooth part of the rubber. Any colors, design or size can be produced...and they *stretch* with and last for the life of the surface. There is no limitation to the colorful decorative possibilities of Elasti-Cals. Send us descriptions or samples of your postwar products for recommendations. No obligation. Address all inquiries to Dept. 56-7.

THE MEYERCORD CO. • 5323 W. LAKE ST. • CHICAGO 44, ILL.

MEYERCORD *Elasti-Cals*



Francis EST. 1880. HYDRAULIC PRESSES

● FOR PLASTIC, RUBBER, ETC.
● LABORATORY OR PRODUCTION JOBS

Here are just a few of the plastic moulded products produced on the production line by Francis Hydraulic presses. Francis Presses are available in a wide range of sizes and models making them ideally suited for laboratory use or large production jobs of plastic, rubber, compreg wood and many other products. Get complete details on Francis line of Presses . . .

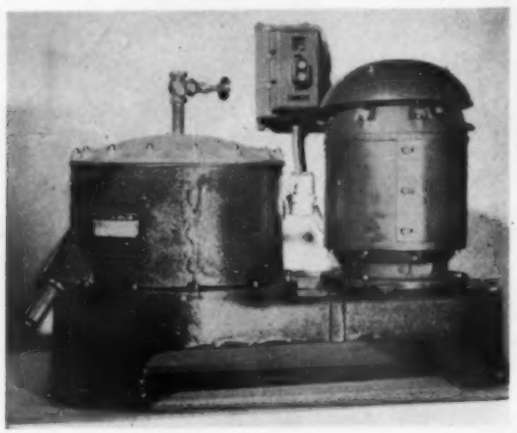
Write or Wire today

The Hosdreg Industries Incorporated
HUNTINGTON, INDIANA

NEW EQUIPMENT

Improved Asbury Fluid Impactor

A new, improved model of the Asbury Fluid Impactor has been developed by the Asbury Corp., Doylestown, Penn. The impactor, which is a mill applicable to the disintegrative treatment of all types of fluid mixtures, employs a specially designed rotor to produce im-



pact upon a liquid by means of centrifugal force. A novel liquid seal, which should exceed the life of the bearings, and circulating oil pumps with sight gravity feed have also been incorporated into the unit. The speed of the unit, which ranges from 3,600 to 15,000 r.p.m., can be varied to meet individual requirements by changing the motor drive pulley and belt. Because of the lack of frictional contact, dimensional changes due to low or high temperatures have no effect on the operation of the mill. The discharge outlet, which is completely immersed in a liquid, has a condenser action. The impactor is used for treating latex, paints, enamels, sizing compositions, printing inks, etc. Besides emulsions, it is recommended for the dispersion of pigments, clays and fillers, and for the treatment of any material which will flow or can be pumped. The resultant product can be made in one continuous process.

Angle Molding Presses

Two newly-designed angle molding presses, for molding plastic products requiring split molds and for molding complicated parts by the transfer method, have been brought out by the Watson-Stillman Co., Roselle, N. J. The outstanding feature of these machines is the elimination of manual handling of split mold sections, thus reducing maintenance cost of such molds and increasing production rates. The presses are of all-steel construction, except for the rams, which are close-grained cast iron. The self-contained radial piston pumping unit, powered by a fully-enclosed motor, can be placed on the floor, in any desired location. Automatic, single-cycle operation from a push-button control panel can be supplied if desired. This system incorporates all adjustments for operation of the machine to predetermined automatic cycle.

The C. P. Hall Co.
CHEMICAL MANUFACTURERS

ACCELERATORS

PLASTICIZERS

ANTIOXIDANTS

A Complete Line of Approved Compounding Materials

AKRON, OHIO • LOS ANGELES, CALIF. • CHICAGO, ILL.

"Well, I'll Be - - -"

Pleased is the word, brother: you'll be *pleased!* When you see in operation, right in your own plant, a web guide that will keep your trim or weave within 1/16" plus or minus, you'll be amazed—and you'll be delighted.

On combining or backing machines, the Stanford Automatic Web Guide will put the selvages squarely together; on coating, spreading, or slitting equipment, it will guide the fabric right up to the wings of the spreading knife, or hold your weave—as we've already said—to 1/16" plus or minus.

It can't be done? Well, we have a way of convincing you: we'll install a Stanford on your equipment at our own expense, and show your men how to operate it. If it doesn't do everything we claim, we'll remove it, and you'll owe us nothing.

Fair enough?

Phone, telegraph or write for a demonstration—or for further information, as you prefer.

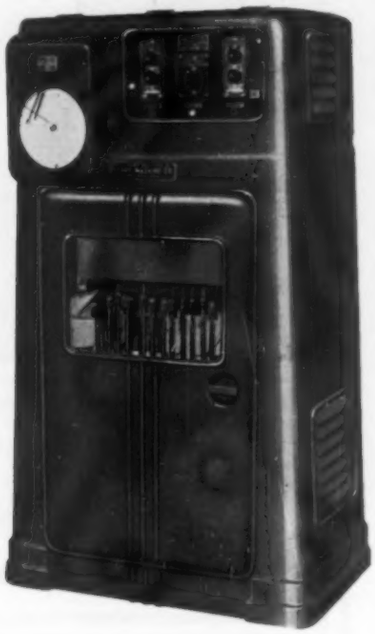
Stanford AUTOMATIC WEB GUIDE

"You can't afford to be without a Stanford"

STANFORD ENGINEERING CO.
SALEM, ILLINOIS

Goodrich Cord Tension Vibrator

A cord tension vibrator, developed by the B. F. Goodrich Co. for the fatigue testing by vibration of cords for tires, belting, and a long list of products in which fabrics play a leading role, as well as filaments for other purposes, is now being manufactured and



sold by the Ferry Machine Co., Kent, Ohio. Effects of variation in temperature, yarn composition, and the fiber structure on the fatigue resistance of the material under test can be accurately measured with the apparatus. Vibration rate can be changed to meet the needs of the particular test. Heat can be applied to the material under observation if desired.

In determining the fatigue resistance of tire cord or other filaments with the new apparatus the material under test is suspended under static load and the upper grips placed in rapid vertical oscillation, which can be made so much faster than the natural frequency of the loaded cord that the lower weights cannot respond and therefore remain substantially motionless. By using these imposed frequencies well above the resonance frequencies of the loaded cords, close comparisons of nearly similar cords can be made.

Successful tire cord tests have been accomplished with the weight on each cord 3.4 pounds to 5 pounds, a vibration frequency of 3600 times a minute, and a displacement of 32 thousandths inch in the cord. When a less sensitive differentiation is desired, by changing parts a displacement of 64 thousandths inch and a frequency of 2700 vibrations per minute has been found suitable. Conditions of testing may be altered as desired through a wide range of vibrations per minute, static load, and lengths of the material under test. Temperature may be varied.

With tire cord it was found that the test more nearly approached conditions in the tire when the vibrating cords were subjected to heat, with a temperature of about 250° F. found suitable. Temperatures ranging from 180° to 340° F. for this test have also been found satisfactory.

Elwell-Parker Die-Handling Truck

A truck for handling dies weighing 10 to 20 tons or more and requiring frequent removal and replacement on presses has been developed by the Elwell-Parker Electric Co., Cleveland, Ohio. In this method of han-

dling dies, the driver pulls up to the press bed and elevates the platform to the height of the bed. He then reels off wire cable, on both sides of the truck, passes each length through a pulley on the end of the platform, and hooks it to the rear side of the die. When the cable is wound on the drum, the die slides off the truck onto the press. In removing the die from the press, the cable hooks are attached to the far side of the die and it is pulled forward from the press onto the platform. One man alone can change dies, once the die is unbolted from the press.

Introduction of **electric contact controls** for circular chart electronic potentiometers has been announced by the Brown Instrument Co., Philadelphia, Penna. Made in two forms, one contains a locking-in type relay, designed primarily for electric furnace control, while the other, without a relay, is designed for direct control of motorized valves, operation of signalling devices, and for applications requiring a "dead" neutral.

FOR LOW HEAT BUILD-UP,
USE PHILBLACK A

(FOR FURTHER DETAILS SEE AD ON PAGE 368)

INFORMATION
on Fabric
FINISHING

Billy Wrinkle says: One purpose of NEW WRINKLES IN FINISHING is to keep fabric coaters acquainted with the latest developments in surface finishing...to show how beauty and sales appeal can be added to coated fabrics without the necessity for investing in expensive engraved rolls. You'll find NEW WRINKLES IN FINISHING interesting reading. Why not drop us a line today and ask us to add *your* name to our mailing list?

NEW WRINKLE INC.
1775 Springfield St., Dayton 3, Ohio

"Wrinkle," "Billy Wrinkle" and "New Wrinkle" are registered trademarks of New Wrinkle, Inc.

VULCANIZED VEGETABLE OILS

—RUBBER SUBSTITUTES—

Types, grades and blends for every purpose, wherever Vulcanized Vegetable Oils can be used in production of Rubber Goods—be they Synthetic, Natural, or Reclaimed.

A LONG ESTABLISHED AND PROVEN PRODUCT

THE CARTER BELL MFG. CO.
SINCE
CARTER BELL PRODUCTS
1903
SPRINGFIELD, NEW JERSEY

REVIEWS

BOOKS

Plastics in Practice. By John Sasso and Michael A. Brown, Jr. Published by the McGraw-Hill Book Co., Inc., 330 West 42nd St., New York 18, N. Y. 7½ x 10½ in. 186 pp. $4.00.

This book is a welcome addition to the growing list of practical text books on plastics. It is a practical review of plastics in a good number of their successful commercial applications, providing a handy key to the essential facts on "how" and "why" plastics are used. The properties of the various plastics and fabricating methods are discussed in direct relationship to proved uses. More than 100 case studies, each typifying the use of a particular plastic or fabricating method, are presented. Discussion is not confined to mechanical considerations alone, but questions of saleability and of costs are given equal prominence, since experience has indicated that such considerations are often the controlling factors in the adoption of plastics. Types of plastics covered in the book are governed by the authors' definition of the word "plastics," which is: "Synthetic organic polymers processed into parts or articles by molding, laminating, casting, machining, not including surface finishes, fibers or those compounds commonly known as synthetic rubbers."

•

A.S.T.M. Standards on Rubber Products. Published by the American Society for Testing Materials, 260 So. Broad St., Philadelphia 2, Penna. 6 x 9 in. 532 pp. $2.75.

This latest compilation of A.S.T.M. standards compiled by Committee D-11 covering rubber products and related materials includes 75 specifications and tests. Some 160 pages are devoted to general methods of testing rubber products including chemical analysis, sample preparation for physical testing, tension testing, accelerated aging, state of cure, adhesion, hardness, changes in liquids, and brittleness. Many other properties are covered.

Test methods for specific rubber products, and specifications for them, are compiled together covering rubber hose and belting; rubber gloves, matting, tape; rubber-coated fabrics; insulated wire and cable; hard rubber and cellular rubber; rubber cements and latices; packing materials; and non-rigid plastics. The book is made complete with the inclusion of several electrical tests and a series of definitions of terms. Several emergency requirements applying to standards for rubber products are given.

•

The Chemical Formulary. (Vol. VII). Edited by H. Bennett. Published by the Chemical Publishing Co., Inc., 26 Court St., Brooklyn 2, N. Y. 5½ x 8½ in. 474 pp. $6.00.

More than 2,000 formulas for mixing and making thousands of products are included in this latest edition of the *Chemical Formulary*. While all previous volumes of the book, issued biennially for the last twelve years, were designed primarily for experienced chemists and technicians, the latest number has been edited especially for laymen. Each of the seven volumes published to date contains different material and can be used separately or as a set. Like previous editions, Vol. VII includes formulas for a multiplicity of items, ranging from adhesives to the various zinc solutions for rust prevention. It covers the latest scientific discoveries in chemistry and industry, such as the DDT insecticides and the newest developments in plastics. The volume also contains an index giving the name and address of mail order firms handling specific products needed for formulary work.

REVERTEX CORPORATION OF AMERICA

37-08 Northern Boulevard
Long Island City 1, N. Y.

Distributors for RUBBER RESERVE CO. of

GR-S LATEX

CONCENTRATED GR-S LATEX (58%)

COMPOUNDS FROM SYNTHETIC LATICES

Agents of Rubber Reserve Co.
for

REVERTEX (73-75%)
60% LATEX
NORMAL LATEX

We maintain a fully equipped laboratory and free consulting service

RANDALL & STICKNEY

Hand Grip Rubber Gauge No. 3-B

Height .....9"	Length .....9¾"	Range .....½"
Depth of Throat ....6½"	Dial 50 Divisions Each Div. 1/1000"	Weight .... 4 lbs. Frame . Aluminum

Designed for gauging stock as it is coming from the calender.

FRANK E. RANDALL, Waltham, Mass.

MAGNESIA

MAGNESIUM CARBONATE
MAGNESIUM OXIDE

EXTRA LIGHT The Original Neoprene Type
A supreme quality product for the rubber trade. Extremely fine state of division. Improves storage stability and resistance to scorching. A curing agent unexcelled for increased modulus, greater resilience, reduced heat build-up, lower compression set and retention of tensile strength during heat service.

LIGHT A high quality product of greater density than "Extra Light," but high in MgO and low in impurities. An excellent value for many uses.

MEDIUM A good value. Very active. High Magnesia content, low in impurities. Medium density.

HEAVY All types can be furnished. Specially ground to meet the exacting Code Pigment Specifications of the Rubber Trade. Unground types for chemical uses.

PACKAGES—Specially designed to protect contents from moisture and air. Corrugated carton with special water-proof liner, and inner paper liner. Five-ply multi-wall bag, including asphalt liner.

Special Service for All Requirements of the Rubber Trade

GENERAL MAGNESITE & MAGNESIA COMPANY

Specialist in Magnesia

2960 East Venango St. **MANUFACTURERS—IMPORTERS—DISTRIBUTORS** **PHILADELPHIA 34, PA.**

Sales Representatives:

AKRON—The G. P. Hall Co.
BOSTON—(Cambridge) — William D. Egleston Co.
BUFFALO—Commercial Chemicals, Inc.
CHICAGO—The C. P. Hall Co.
DENVER—The Denver Fire Clay Co.
DETROIT—C. L. Hueston
LOS ANGELES—The C. P. Hall Co. of California
MONTREAL—Canadian Industries, Ltd.
NEWARK, N. J.—Chas. S. Wood & Co., Inc.
PORTLAND, ORE.—Miller & Zehrung Chemical Co.
ST. PAUL, MINN.—George C. Brandt, Inc.
SEATTLE, WASH.—Carl F. Miller & Co.
TRENTON, N. J.—General Supply & Chemical Co.

CAPITOL PROCESS LINER TREATMENT

•

Obtain Efficiency

and Economy by

using our

CAPITOL PROCESS

on your next order

for Rubber Repellent

Liners.

•

TEXTILE PROOFERS, INC.

181-193 Culver Ave., Jersey City 5, N. J.

Originators of the Liner *Capitol Process Treatment*

Technical Data on Plastics. (Revised). Issued by the Plastics Materials Manufacturers' Association, Tower Building, 14th and K Sts., Washington 5, D. C. 8½ x 11 in. 164 pp. $1.50.

This revised edition, the first since August, 1943, covers 20 types of plastic materials and tabulates all known data for use of those in industry and government concerned with the application of such materials in the war effort. Material for which data are given are: casein plastic, cast allyl plastics, cast phenolic resins, cellulose acetates, cellulose acetate butyrates, cellulose nitrate, ethyl cellulose, laminated phenolic products, melamine molding materials, methyl methacrylates, nylon, phenol-formaldehyde molding materials, phenol furfural molding materials, polyethylene plastics, polystyrenes, polyvinyl formals, acetals and butyrals, polyvinyl chloride plastics, urea-formaldehyde molding materials, vinylidene chloride, and vinyl chloride-acetate resin compounds. Tabulations for each material are divided into two sections, one listing properties bearing primarily on fabrication, and the other with strength of the finished product. Effects of temperature and humidity on test values are indicated by graphs in some instances.

•

How to Handle Labor Grievances. By John A. Lapp. Published by the National Foremen's Institute, Inc., Deep River, Conn. 5½ x 8 in. 294 pp. $4.00.

A practical treatment of the disagreements, disputes and grievances between management and labor, which so often lead to serious labor problems if carelessly treated, is provided in this manual. The scope of the manual is indicated by the titles of the five parts into which it is divided, as follows: (1) Background and History of Grievance Procedures; (2) Grievances and How to Deal with Them; (3) Outline of Grievance Procedures; (4) Grievance Procedures in Selected Industries; (5) Problems of Grievance Procedures. An appendix includes a number of short forms of grievance and arbitration procedures used by small, medium and large concerns.

•

The Carbon Reinforcement of Neoprene GN. Columbian Carbon Co., 41 East 42nd St., New York 17, N. Y. 5½ x 7¾ in. 88 pp.

Issued as Vol. VI, No. 1, of the "Columbian Colloidal Carbons" series, the studies in this report were designed to trace the trend of properties with colloidal carbon surface. It is divided into five sections, as follows: (1) Comparison with Published Data: (2) Effect of Carbon Loading and Grade on Neoprene GN; (3) The Three Basic Properties of Carbon and Their Effect on Neoprene GN; (4) Rubber Property Correlations; (5) Lower Modulus in Neoprene GN. A bibliography is included.

SINCE 1880 RUBBER GOODS

Rand. REG. U. S. PAT. OFF.

"They Last Longer" REG. U. S. PAT. OFF.

DRESS SHIELDS
DRESS SHIELD LININGS
BABY PANTS
BABY BIBS & APRONS
SANITARY WEAR
RUBBERIZED SHEETING
RUBBER APRONS
STOCKINET SHEETS
RUBBER SHEETS
RAINCAPES & COATS
RUBBER SPECIALTIES
DOLL PANTS, CAPES, ETC.
RUBBER DAM & BANDAGES — SHEET GUM

RAND RUBBER CO. BROOKLYN, N. Y. U. S. A. MFRS.

OVENS

OVEN-MATERIALS-HANDLING SYSTEMS
OVEN PROCESSING SYSTEMS FOR ALL MATERIALS

THE INDUSTRIAL *Oven Engineering* COMPANY

11621 Detroit Avenue Cleveland 2, Ohio

- **RESIN EMULSIONS**
- **LATEX COMPOUNDS**
- **DEODORIZERS**
- **RUBBER CEMENT**
- **THICKENERS**
- **CURING DISPERSIONS**
- **PIGMENT DISPERSIONS**

For Latex Compounding

— IMMEDIATE DELIVERY —

RUBBER & PLASTIC MANUFACTURERS

ADHESIVE PRODUCTS CORPORATION

1660 Boone Ave., Bronx 61, N. Y.

COLITE CONCENTRATE

A HIGH QUALITY CONCENTRATED LIQUID MOLD AND MANDREL LUBRICANT— *NON-TOXIC, NON-TACKY, ODORLESS.*

- *Simplifies the removal of cured rubber from the molds.*
- *Results in a transparent satin-like finish.*
- *Does not build up on the molds.*
- *Extremely concentrated and low in cost.*

A Direct Source for Zinc and other Metallic Stearates.

THE **BEACON** COMPANY

PURITY · UNIFORMITY · DEPENDABILITY

Chemical Manufacturers

97 BICKFORD STREET · BOSTON, MASSACHUSETTS

In Canada: PRESCOTT & CO., REC'D., 774 ST. PAUL ST., W. MONTREAL

SULPHUR *and* **CHEMICALS FOR THE RUBBER INDUSTRY**

CRYSTEX insoluble SULPHUR

Commercial Rubbermakers' Sulphur, Tire Brand, 99½% Pure
Refined Rubbermakers' Sulphur, Tube Brand, 100% Pure
Carbon Tetrachloride, Carbon Bisulphide
Caustic Soda, Sulphur Chloride

*Aluminum Sulphate
Borax
Boric Acid
Citric Acid

*Copperas
Cream of Tartar
Liquid Chlorine
Muriatic Acid
Nitric Acid

Silicon Tetrachloride
Sodium Hydrosulphide
Stripper, Textile
Sulphur
Sulphuric Acid

*Superphosphate
Tartar Emetic
Tartaric Acid
Titanium Tetrachloride

(*Sold on West Coast Only)

Stauffer CHEMICALS SINCE 1885

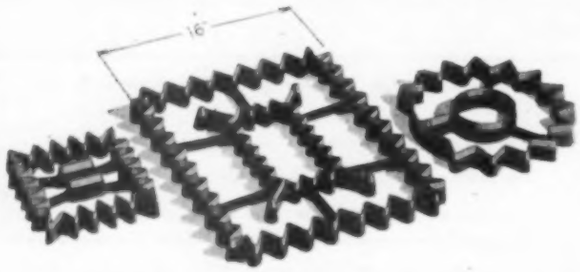
STAUFFER CHEMICAL CO.

420 LEXINGTON AVE., NEW YORK 17, N. Y.
221 NO. LA SALLE STREET, CHICAGO 1, ILL.
624 CALIFORNIA ST., SAN FRANCISCO, CAL.
HOUSTON 2, TEXAS
555 SO. FLOWER ST., LOS ANGELES 13, CAL.
424 OHIO BUILDING, AKRON 8, OHIO
NORTH PORTLAND, OREGON
ORLANDO, FLORIDA

DIC

SHARP EDGE CUTTING DIES

Also TOOLS, DIES, JIGS, FIXTURES, MOLDS and MACHINE PARTS



—41 Years in St. Louis—

For Excellent Workmanship

TRY

INDEPENDENT DIE & SUPPLY CO.

LaSalle & Ohio Sts., St. Louis 4, Mo.

Materials

PROCESSING EQUIPMENT

Sifters, Crushers, Cutters, Dry and Liquid Mixers, Mills, Grinders, Pulverizers, Conveyor Systems, Complete Installations.

The handling equipment construction "know-how" of the Mercer Engineering Works, Inc., Clifton, N. J. . . . The more than 40 years processing equipment experience of Robinson Mfg. Co., Muncy, Pa. . . . All are embodied in and represented by

MERCER-ROBINSON, CO., INC.

30 CHURCH ST., NEW YORK 7, N. Y.

Materials

HANDLING EQUIPMENT

Trailer Trucks (All Types) Wheel Tractor Cranes (3 to 7 ton) Fork Lift Trucks, Lift Platforms, Hoists, Live Skids, Wheels, Casters.

BOOKLETS, CATALOGS, Etc.

Experiments with Rubber in Mexico. By S. K. Lowe and Maurice Ries. Published by the Middle American Research Institute of the Tulane University of Louisiana, New Orleans, La. 7¾ x 10¾ in. 114 pp.

Based on the discovery of an old Spanish manuscript covering experiments made between 1785 and 1798, and published with the cooperation of the Firestone Tire & Rubber Co., this document reveals that rubberized textiles had been in use for some time prior to 1785, and accordingly pushes back the acknowledged date for the first extensive commercial use of rubber about 40 years. The discovered manuscript, translated by Mr. Lowe, indicates that a series of experiments were ordered by the Viceroy of Mexico in an effort to find a leak-proof container for the shipment of quicksilver (mercury). The entire manuscript is reproduced in the current document, along with an extensive introduction by the authors.

•

Flexible Molds of Neoprene Latex. Rubber Chemicals Division, E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Delaware. 6¼ x 9¼ in. 6 pp.

As indicated by its title, this bulletin details a method for the preparation of flexible molds of neoprene latex suitable for the production of small statuary, plaques, and novelties. Typical formulas are given and the method is traced step by step. Molds made of neoprene latex are said to have the advantages of very good heat, abrasion and age resistance. They may be used for casting at temperatures up to 300° F. and possibly higher.

•

Apparatus for Electrolytic Conductivity Measurements. (Catalog EN-95). Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia 44, Penna. 7¾ x 10½ in. 48 pp.

This revised edition of the company's descriptive catalog of instruments for making precise conductivity measurements presents much the same data about methods of measurement and notes for selection and use of the apparatus as the previous catalog. In addition, however, there are descriptions and illustrations of a signalling conductivity controller and several new industrial cells.

COMPOUNDS CURED AND UNCURED • PLANTATION RUBBERS • BALATA • BUNA S • ACRYLICS • ACETATE • BUTYRATE • VINYL RESINS • POLYSTYRENE • AUTO TIRES • SPLIT PARTS • HARD RUBBER DUST • INNERTUBES • GUAYULE • BALATA • NEOPRENE • BUNA S • BUTYL RUBBER • ACETATE •

SCRAP

Rubber Synthetics Plastics

MEYER & BROWN CORP.

Founded 1894

347 Madison Ave., New York 17, N. Y.

• WILD RUBBERS • GUAYULE • NEOPRENE • BUTYL RUBBER • VISTANEX •

Count on Top Efficiency with ORVUS

ORVUS

As a MOLD LUBRICANT

—Orvus permits articles to leave molds readily; molds clean easily.
—Orvus is effective in hardest water.
—Orvus forms no insoluble materials which might be deposited as a film on mold or rubber.

For WASHING and FINISHING

—Orvus cleans thoroughly such articles as inner tubes, automotive parts and other molded and extruded rubber goods. Leaves articles with a pleasing finish.

Write for further details about Orvus.

PROCTER & GAMBLE
CINCINNATI, OHIO

ORVUS is a sulfated alcohol type cleanser—not a soap.

SAME OBJECTIVE

...different results

Grinding methods of years gone by, especially the one used by cave men, were crude. But, they served the purpose at that time.

Today, grinding done by Whittaker, has become an exact science. It is more than merely pulverizing raw materials for rubber to a specified maximum micron size. As an instance, it involves a comprehensive study of the crystalline structure of various grades of the same mineral. This results in a better understanding of the characteristic properties and how they will be affected by grinding.

As a benefit of this research at Whittaker, you get the proper grade of rubber ingredients, ground to the proper maximum micron size, which will aid in bettering the over-all quality of your rubber products.

Talc • Stearates • Heavy Magnesium Oxide • Pumice Stone • Whiting Extra Light Calcined Magnesium • Sericite • Magnesium Carbonate Pyrophyllite

8031

WHITTAKER EST. 1890

Whittaker, Clark & Daniels, INC.

260 West B'way, New York 13, N. Y. • Plant: South Kearney, New Jersey

Sales Representatives
CHICAGO — Harry Holland & Sons
NEW ORLEANS — Edward W. Ortenbach
PHILADELPHIA — Peltz & Company
TORONTO & MONTREAL — Richardson Agencies, Ltd.
CLEVELAND — Palmer Supplies Co., formerly Palmer Schuster Co.

NEVILLE

For your wartime formulas . . .

Dibutyl Phthalate

★ *We solicit your inquiries*

R-7

THE NEVILLE COMPANY
PITTSBURGH • PA. M-90
Chemicals for the Nation's War Effort

BENZOL • TOLUOL • XYLOL • TOLUOL SUBSTITUTES • CRUDE COAL-TAR SOLVENTS
HI-FLASH SOLVENTS • PAINT AND VARNISH REMOVERS • COUMARONE-INDENE RESINS
RUBBER COMPOUNDING MATERIALS • WIRE ENAMEL THINNERS • DIBUTYL PHTHALATE
TAR PAINTS • RECLAIMING, PLASTICIZING, NEUTRAL, CREOSOTE, SHINGLE STAIN OILS

NEOPRENE COMPOUNDERS!

investigate **Baker's CALCINED MAGNESIA**

Baker supplies what neoprene compounders demand—Calcined Magnesia that is always uniform.

Test it in wetting power—in ease of dispersion—stability of compounded stock—rate of cure—tensile strength and plasticity.

Learn why Baker's Light Calcined Magnesia is better.

Send for free samples

J. T. BAKER CHEMICAL CO.
Phillipsburg, New Jersey

Wartime Technological Developments. Prepared by the Department of Labor, Washington, D. C. 6 x 9 in. 418 pp. Available from Superintendent of Documents, Washington 25, D. C., at 50c per copy.

This report, comprising a study of wartime technological developments in the United States, was prepared by the Productivity and Technological Development Division of the Bureau of Labor Statistics for the Subcommittee on War Mobilization of the Senate Committee on Military Affairs. Divided into two parts, it first presents a brief appraisal of the published literature on wartime technological developments and then digests some of the more significant excerpts from this literature for 1942 and 1943. A digest for the year of 1944 is now in preparation and will be issued as a supplement to the present report in the near future. All types of materials and all kinds of processes are covered in the report, a good number of them of direct interest to the rubber manufacturing industry, most of which were digested from the various rubber journals. A detailed cross-reference index is included.

•

Chemicals for Industry. Cellulose Products Dept., Hercules Powder Co., Wilmington, Delaware. 3¾ x 9 in. 16 pp.

This is a handy pocket-size booklet containing a list of chemicals made and sold by the company. Data given includes types available, end use, and pertinent packing and shipping information. The chemicals listed include nitrocellulose, cellulose acetate, ethyl cellulose, Parlon, Clorafin, and CMC (sodium carboxymethylcellulose).

•

Labors of War for Peace. Hercules Powder Co., Inc., Wilmington, Delaware. 9 x 12 in. 44 pp.

This booklet reproduces the colorful advertisements Hercules Powder has been using during the critical war years to describe work the company has been doing in supplying the industrial front. Built on facts of immediate usefulness, the advertisements give specific examples of product war services and suggest postwar applications of war-born chemical developments. Products covered include chemical cotton, paper makers chemicals, cellulose materials, and explosives.

•

Fundamentals of Industrial Electronics. (Bulletin GEA-4309). General Electric Co., Schenectady, N. Y. 8½ x 11 in. 40 pp.

This booklet consists of reprints of eight articles by G. M. Chute, General Electric engineer, which have previously appeared in *Steel*. The booklet provides a working knowledge of the basic principles of the subject and of their commercial applications, with special references to recent developments of particular interest to the metal producing and metalworking industries.

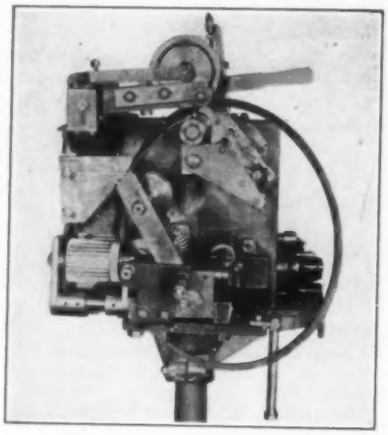
AIR BAG BUFFING MACHINERY
STOCK SHELLS HOSE POLES
MANDRELS
NATIONAL SHERARDIZING & MACHINE CO.
868 Windsor St. Hartford, Conn.
Representatives: Akron San Francisco New York

MOLDEZE
The Mold Treatment for Plastics and Rubber
"In all our years in the rubber business we never have seen the equal to MOLDEZE" . . . says Chf. Engr. famous rubber firm.
Majority of Leading Firms now use MOLDEZE
Send for 1 long-lasting pint . . . $5 delivered
PROTECTIVE COATINGS, INC., BOX 56RA, DETROIT 27

Utility Crimper Type Flipper

for

Truck and Large Balloon Tires



UTILITY MANUFACTURING COMPANY

Cudahy, Wisconsin

Cable Address: UTILITY-MILWAUKEE

Long Distance Phone Call

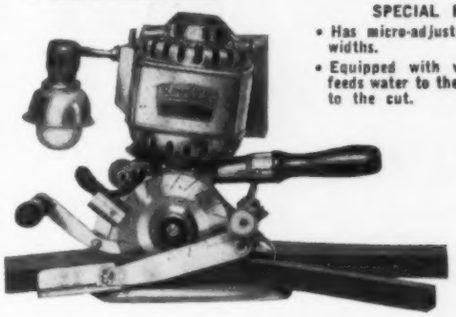
MILWAUKEE—SHERIDAN 7020

SIMPLEX
REG. TRADE MARK

RUBBER STRIP CUTTER

PATENTED

A PORTABLE machine capable of stripping slab rubber up to 1″ thick at the rate of 20,000 feet in 8 hours. Any width desired.



SPECIAL FEATURES

- Has micro-adjustment for accurate widths.
- Equipped with water tank which feeds water to the slotted knife and to the cut.
- Has repulsion-induction motor which carries any overloads.
- Automatic sharpener device keeps knife keen and sharp.
- Has base with rollers and is very easy to handle.

Cuts within 1/64 inch to 1/100 inch tolerance depending on grades of rubber. Cuts a slab down to the last shaving. Cuts all grades of rubber including pure gum, sponge, etc. Cuts squarely—no rejects.

Now in use by many leading Rubber Manufacturers & Jobbers

Simplex Cloth Cutting Machine Co., Inc.

Manufacturers of a Complete Line of Cloth Cutting Machinery

270 West 39th St. New York 18, N. Y.

Cable Address—SIMPLEX, N. Y. *Phone*—WIsconsin 7-5547

AUTOMATIC MILL BATCH-OFF MACHINE

A Big Time and Labor Saver for the Rubber Industry

Why lose valuable mixing time slabbing off by hand when it can be done automatically?

At last you are able to reduce that Banbury cycle.

One more of your synthetic rubber problems solved.

Write Today for Full Particulars

The Akron Standard Mold Co.

Akron "The Established Measure of Value" **Ohio**

CONTINENTAL MACHINERY CO.
261 BROADWAY - - NEW YORK 7, N. Y.

•

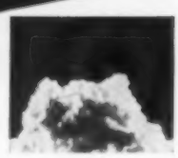
Designers and Manufacturers of

RUBBER PLANT EQUIPMENT

- **All types of Rubber Machinery and Plant Equipment for every requirement of Large and Small Factories.**
- **Complete Plant Design and Layout; also Special Machinery Developed and Manufactured.**
- **Specialists in Latex Equipment.**
- **Complete Laboratory Facilities for Chemical and Product Development and Research.**
- **Technicians Furnished for Factory Design and Operation in all countries.**

Cable Address "Centimac" New York — COMCO — *Telephone* WOrth 2-1650

TO REDUCE MARKING IN SOLE STOCKS



"Filfloc" cotton filler minimizes marking and improves strength. For crude, synthetic and reclaim. Samples on request. Able research assistance rendered.

RAYON PROCESSING CO. of R.I. INC.
100 TREMONT ST., CENTRAL FALLS, RHODE ISLAND
Developers and Producers of Cotton Fillers for Plastics

REVIEWS (CONT'D)

Goodrich Rubber Adhesives. B. F. Goodrich Co., Akron, Ohio. 8½ x 11 in. 12 pp.

This booklet describes the natural and synthetic rubber adhesives which the company manufactures and gives directions for the application of both types. Synthetic rubber cements designed to meet bonding requirements for synthetic rubber products are also described. Included is a discussion on how to choose the right kind of cement for various applications, and an outline of differences between vulcanizing and non-vulcanizing types of rubber cement, as well as a table giving data on cement weights, colors, and base materials used.

•

Precision Safety Heaters. (Bulletin HP-1650). Precision Scientific Co., 1736 N. Springfield Ave., Chicago 47, Ill. 8½ x 11 in. 4 pp.

This bulletin describes the safety heaters made by the company for heating complex glassware set-ups involving distillation columns, cumbersome flasks, delicate reflux condensers and other costly glassware. Advantages claimed for the heaters are freedom from fire hazards, conservation of samples, rapid easy handling, and rapid heating. The bulletin includes a list of sizes, with dimensions and prices, and a temperature chart.

•

A Special Report for Product Designers. Ohio Rubber Co., Willoughby, Ohio. 8½ x 11 in. 4 pp.

This folder outlines the research, engineering, and factory facilities and services which the company offers to product designers. It also contains tabular data on the forming and curing of mechanical molded and extruded rubber; the comparative bonding qualities of those materials in relation to various metals, wood, fibre, celotex, and glass; and on the comparative physical and chemical properties, sources, trade names, available forms, and processing qualities of natural and synthetic rubbers.

•

Fairprene Sheet Stocks. Fabrics Division, E. I. du Pont de Nemours & Co., Inc., Fairfield, Conn. 8½ x 11 in. 10 pp.

Procedures and results to determine the resistance of "Fairprene" synthetic rubber sheet stocks to oils, greases, gasoline, kerosene and crude oils, alcohol solvents, acids and alkalies, their resistance to natural and accelerated aging in air and oxygen, resistance to heat and cold, fresh and salt water, set and drift, as well as their flame resistance, are supplied in this technical service manual. The manual is illustrated with graphs and charts.

FOR GOOD ABRASION RESISTANCE, USE PHILBLACK A

(FOR FURTHER DETAILS SEE AD ON PAGE 368)

Now...Know in Advance the WEARABILITY of

- RUBBER
- Paint
- Lacquer
- Plating
- Textiles
- Leather
- Metals

With the TABER ABRASER

Whether you *make* or *buy* any of the products listed, you'll make or buy *better quality* if you pre-test them quickly, simply with the marvelous Taber Abraser. Now used by hundreds of America's leading industries. Soon earns its cost many times over.

WEAR TESTING MANUAL—FREE! Write today for our new Taber Wear Testing Manual. Shows you how to test, why it pays to test. Contains information that every research department should have.

★ Taber Instrument Corporation ★
111RA GOUNDRY STREET NORTH TONAWANDA, N. Y.

The Taber Test Proves What Wears Best!

Plan NOW to Speed Up Production

New Laboratory Mills

Two Sizes
6" x 12"
6" x 16"

IF your post war plans for greater production call for special Rubber machinery, we invite you to submit them to Thropp Engineers NOW. They will gladly work with you in designing custom built mills for your particular requirements to enable you to convert quickly to peace time production. Write NOW!

WM. R. THROPP & SONS, CO.
Trenton, N. J.

HEVEATEX

Agents of Rubber Reserve Company for Natural Latex. Distributors of GR-S Latex

Rubber Latex Compounds
Synthetic Rubber Latex Compounds
Synthetic Resin Compounds and Adhesives
Synthetic Latex Adhesives
Aqueous Dispersions of Reclaimed Rubber

• • • •

Write us for further information

Trade Mark

HEVEATEX CORPORATION

78 GOODYEAR AVE., MELROSE, MASS.

CHICAGO, ILL., First National Bank Bldg. AKRON, OHIO, Ohio Building

Trade Mark

MARKETS

Rubber – Crude, Reclaimed and Scrap – Cotton – Ducks – Tire Fabrics – Sheetings

NEW YORK, JULY 11, 1945

Crude Rubber

THE latest report of the Rubber Reserve Co., covering the 1940-45 period reveals that during the three program years of 1942, 1943 and 1944, a total of 113,044 long tons of rubber were imported into the United States from program countries and Liberia. The "program countries" are those countries with which special arrangements were made on rubber procurement, and consist largely of the Latin American countries.

The report also reveals another little known objective of the rubber procurement program, i.e., the achieved reduction in the consumption of rubber and rubber goods in the producing countries. Informed estimates, according to the report, indicate that the program countries consumed 20,800 long tons of natural rubber in 1941, the year preceding the procurement and conservation program, as against 13,800 long tons in 1942, 12,200 tons in 1943, and 14,500 tons in 1944.

Rubber experts are still optimistic over the possibility of early resumption of natural rubber from the Far East. The Allied campaign in northwest Borneo is rolling ahead smoothly, apparently up to plan, and several large plantations have already been recovered. According to one press report, of special interest to the rubber field, the Australians found the Japanese had wrecked all oil refinery facilities at Luton, center of the Seria fields, but the great rubber plantations of Sarawak State were almost completely undamaged. Furthermore, there was no sign of Japanese development of the plantations during the three years of occupation, and little evidence of jungle growth.

Prices shown below are ceilings set by the Rubber Reserve Company:

	C	N-C
Plantations—		
Ribbed Smoked Sheets, 1X	22½	40
Thick Pale Latex Crepe, 1X	22½	40
Thin Pale Latex Crepe, 1X	22½	40
Thick Brown Crepe, 1X	21⅜	38⅞
Thin Brown Crepe, 1X	21⅜	38⅞
Thick Remilled Blankets, #1	21⅜	38⅞
Rolled Brown or Flat Bark	18	35½
Smoked Blankets, #1	21⅛	38⅝
Claro Brand 1XRSS	22½	40
Sole Crepe Trimmings	22	39½
Sole Crepe	22½	40
Wild—		
Uncut Fines, Crude	15	29
Cut Fines, Crude	15½	29¾
Cut Fines, Washed & Dried	22½	40
Upriver Coarse, Crude	12⅜	26⅛
Upriver Coarse, Washed & Dried	20¼	37¾
Caucho Ball, Crude	11⅝	24¾
Caucho Ball, Washed & Dried	19½	37
Guayule—		
Carload Lots	17½	31
Less than Carload Lots	18	31½
Balata—		
Surinam Sheet	42½	42½
Manaos Block	38¾	38¾
Colombian Block	38¾	38¾
Peruvian Prime	38¾	38¾
Chicken Wire	23¼	23¼
Latex—		
Normal, Tank Car Lots	26	43½
Creamed, Tank Car Lots	26¾	44¼
Centrifuged, Tank Car Lots	27¾	45¼
Heat-Concentrated, Carload Drums	29½	47

C for Civilian Use; N-C for Non-Civilian Use.

Scrap Rubber

Dealers report that the shrinkage noted in scrap rubber stocks in recent months still continues, but recent events indicate that the trend may soon be reversed. The present supply of scrap in the United States, usable for making reclaimed rubber, was estimated to be sufficient to last approximately seven months as of June 1. At that time it was also estimated that this amount may be reduced to a five-months supply by the end of 1945. Increasing the monthly passenger car tire allotment to 2,500,000 for June, and maintaining that allotment for July, means that greater amounts of tire scrap will soon find its way into trade channels, thus reversing the present trend. Segregation of synthetic scrap still remains a major problem and no satisfactory solution has yet been offered. Prices shown below are ceilings on typical grades of scrap:

(Prices to Consumers, Delivered Akron)

Mixed passenger tires	ton	$20.00
Beadless truck tires	ton	26.00
Mixed truck tires	ton	20.00
Beadless passenger tires	ton	26.00
No. 1 passenger peelings	ton	52.25
No. 1 truck peelings	ton	52.25
No. 2 passenger tubes	lb.	.07¼
Red passenger tubes	lb.	.07½
Black passenger tubes	lb.	.06¾
Mixed passenger tubes	lb.	.06½
No. 2 truck tubes	lb.	.07½
Red truck tubes	lb.	.07¼
Black truck tubes	lb.	.06½
Buffings	ton	35.00
Bicycle tires	ton	15.00
Air bags and water bags	ton	15.00
Boots and shoes	ton	33.00

Tire Fabrics

The situation in the tire fabric field remains unchanged, with practically no demand for such fabrics. Consequently, prices are nominal and in many quarters are not even being quoted. The prices shown below are those which were in force on or about January 15, 1942.

(Prices Net at the Mill)

Peeler, carded, 23/5/3	lb.	.43½ @	.44
Peeler, carded, 23/4/3	lb.	.44½ @	.45
Peeler, carded, 15/3/3	lb.	.41½ @	.42
Peeler, carded, 15/4/2	lb.	.41½ @	.42
Peeler, carded, 13/3/3	lb.	.40½ @	.41
CHAFERS			
Carded, American, 1 1/16"	lb.	.43½ @	.44
Carded, American, 1"	lb.	.39½ @	.48

Sheetings

48x40	36	in.	5.50	lb.	—	@ 8.272
40x40	36	in.	6.15	lb.	—	@ 7.398
40x36	36	in.	6.50	lb.	—	@ 7.000
48x48	40	in.	2.50	lb.	—	@17.200
48x48	40	in.	2.85	lb.	—	@15.087
56x60	40	in.	3.60	lb.	—	@12.638
48x44	40	in.	3.75	lb.	—	@11.733

Note: Prices shown above are ceiling prices set by order of the O.P.A.

Cotton

The price of middling uplands on the Cotton Exchange has swung in a 48 point range since our last report, high for the period being 23.55 on June 12 and low 23.07 on July 3. The average price of middling uplands on the Exchange for the month of June was 23.42, based on 26 trading days. Prices moved downward steadily through the last half of June due to a number of contributing factors, mainly market hesitancy caused by uncertainties connected with the Government purchasing program. Market nervousness led to waves of liquidation, with little mill support to stop such trends, with the result that there was little activity to stop such liquidation. Recurring reports of low crops, combined with the growing tightness of desirable grades, turned the price trend in the past few days, today's quotation of 23.45 being only 10 points under that at the start of the period (June 12). On July 9 the Department of Agriculture announced that the smallest acreage of cotton to be harvested in the 60 years since 1885 was in prospect this year. The area under cultivation was estimated at 18,355,000 acres, which is 2,000,000 acres, or 9.8%, less than last year. Quotations for middling uplands on the Exchange follow:

	June 11	July 11		
	Close	High	Low	Close
July	23.05	22.85	22.68	22.72
October	22.74	23.11	23.00	23.00
December	22.70	23.14	22.99	23.02

Reclaimed Rubber

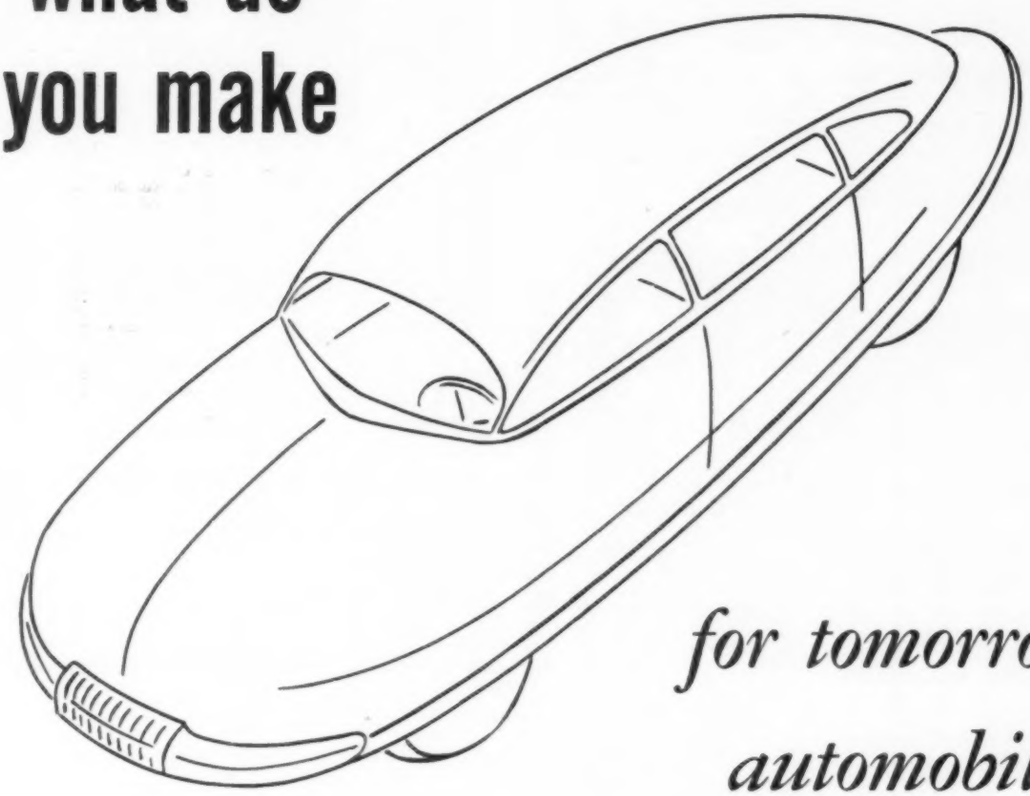
With the exception of the slight slackening which is always evident during the summer months, attributable to vacation periods, shutdowns for machinery and equipment overhaul, and the like, the demand for reclaim continues at the high pace established in recent months. In keeping with the trend of recent months, demand is spread over practically all branches of the rubber manufacturing field. John Ball, technical sales representative of the Midwest Rubber Reclaiming Co., and formerly associated with the Office of the Rubber Director, is again on Washington service, this time heading up the reclaim and scrap activities of the WPB Rubber Bureau. Prices shown below are ceilings on typical grades of reclaim:

Shoe			
Unwashed	lb.	.07½ @	.07¾
Tube			
Black Tube	lb.	.11¾ @	.12
Red Tube	lb.	.12½ @	.12¾
Tires			
Black (acid process)	lb.	.08 @	.08¼
Black, selected tires	lb.	.07 @	.07¼
Truck, Heavy Gravity	lb.	.09 @	.09¼
Miscellaneous			
Mechanical blends	lb.	.05 @	.06
White	lb.	.13½ @	.13¾

Ducks

Enameling (single filling)	lb.	— @	.44¼
Belting and Hose	lb.	— @	.39
Single filling, A grade	lb.	— @	.19¾
Double filling, A grade	lb.	— @	.20¾

what do you make



for tomorrow's automobile?

Of all the engineering advancements that have been combined in the manufacture of modern transportation, none perhaps, has contributed more to the comfort, safety and long-life of the motor car than the engineered use of rubber. Thus, it is axiomatic that as automobiles are improved, the poundage of rubber per unit is increased proportionately.

True it is, too, that—except for tires—the majority of the many rubber parts of the modern car are made of Reclaimed Rubber . . . for Reclaim long ago proved its ability to serve economically and, in every respect, more than adequately.

Now that new millions of cars are beginning to roll off production lines, Buffalo standardized grades again are available to motor manufacturers and the hundreds of producers of rubber items that will help make tomorrow's cars better than ever.

Write Buffalo today . . . to learn how this 63-year-old company can assist in your own plans through supplying the proper grades for your specific needs.

U. S. RUBBER RECLAIMING COMPANY, INC.

500 FIFTH AVENUE • NEW YORK 18, N. Y. • (Plant at Buffalo, N. Y.)

TRENTON . . . H. M. ROYAL, Inc., 689 Pennington Avenue • TORONTO . . . H. VAN DER LINDE, Ltd., 156 Yonge Street

63 Years Serving the Industry Solely as Reclaimers

CHEMICAL MARKETS

New York, July 11, 1945
All Prices F.O.B. Works

ACCELERATORS

Organic			
A-1 (Thiocarbanilid)	lb.	.28	.33
A-10	lb.	.36	.42
A-19	lb.	.52	.58
A-32	lb.	.60	.70
A-77	lb.	.42	.55
A-100	lb.	.42	.55
Aldehyde ammonia, crystals	lb.	.65	.70
Altax	lb.	.39	.41
Beutene	lb.	.59	.64
B-J-F	lb.	.34	.39
Butasan	lb.	—	1.10
Butyl Zimate	lb.	—	1.10
Captax	lb.	.34	.36
Crylene	lb.	.40	.47
Di-Ortho-Tolyguanidine	lb.	.44	.46
Diphenylguanidine	lb.	.35	.41
El-Sixty	lb.	.36	.43
Ethasan	lb.	—	1.10
Ethyl Tuads	lb.	—	1.25
Ethyl Zimate	lb.	—	1.10
Ethylidine aniline	lb.	.42	.43
Formaldehyde aniline	lb.	.31	—
Guantal	lb.	.39	.48
Hepteen	lb.	.34	.39
Hexamethylenetetramine	lb.	.33	—
Lead Oleate, No. 999	lb.	.13	—
Witco	lb.	.15	—
Ledate	lb.	—	1.20
Methasan	lb.	—	1.20
Methyl Tuads	lb.	—	1.25
Methyl Zimate	lb.	—	1.20
Monex	lb.	—	1.25
Pentex	lb.	.74	.84
Phenex	lb.	.49	.54
Pip-Pip	lb.	—	1.63
R & H 50-D	lb.	.42	.43
R-2 Crystals	lb.	—	1.55
Rotax	lb.	.44	.46
Safex	lb.	1.15	1.25
Santocure	lb.	.60	.67
Selenac	lb.	—	1.60
SPDX-G	lb.	.53	.58
Super-Sulfur No. 2	lb.	.13	.15
Thiocarbanilid, drums	lb.	.28	.33
Thiofide	lb.	.39	.46
Thiotax	lb.	.34	.41
Thiurad	lb.	—	1.25
Trimene	lb.	.54	.64
base	lb.	1.03	1.18
Triphenylguanidine	lb.	.45	—
Ulto	lb.	.99	1.04
Ureka	lb.	.50	.57
Blend B	lb.	.50	.57
Blend C	lb.	.48	.55
Vulcanex	lb.	.42	.43
Vulcanol	lb.	.85	—
Inorganic			
Litharge, domestic	lb.	.07	.07½
Magnesia, calcined, heavy	lb.	.04	—

COLORS

Blues [b]			
Prussian	lb.	.36	—
Ultramarine	lb.	.17	.27
Browns [b]			
Mapico	lb.	.1135	—
Umber, Turkey	lb.	.04¼	—
Greens [b]			
Chrome	lb.	.23	—
Guignet's Green	lb.	.70	—
Reds			
Antimony crimson, 15/17	lb.	—	—
Indian	lb.	.08¼	—
Domestic (Maroon)	lb.	.11	—
Mapico	lb.	.096	—
Red oxide, pure	lb.	.10	.12
Rub-Er-Red	lb.	.09¼	—
Whites [b]			
Cryptone No. 19	lb.	.0560	.0585
Cryptone CB No. 21	lb.	.0560	.0585
Cryptone ZS-800	lb.	.0825	.0850
Lithopone:			
Albalith	lb.	.04¼	.04½
Astrolith	lb.	.04¼	.04½
Azolith	lb.	.04¼	.04½
Ray-cal	lb.	.05½	.05¾
Rayox	lb.	.14½	.15¼
Titanox A	lb.	.14½	.14¾
Titanox B	lb.	.05¾	.06
Titanox C	lb.	.05½	.05¾
Zinc Oxide—American Process [b]			
American Azo:			
ZZZ (lead free)	lb.	.07¼	.07½
Anaconda, lead free	lb.	.07¼	.07½
Horsehead Lead Free Brand:			
Special—3	lb.	.07¼	.07½
XX Red—4	lb.	.07¼	.07½
Kadox, black label—15	lb.	.07¼	.07½
Red label—17	lb.	.07¼	.07½
72	lb.	.07¼	.07½
St. Joe, black label	lb.	.07¼	.07½
green label	lb.	.07¼	.07½
red label	lb.	.07¼	.07½
U. S. P.—7, bbls.	lb.	.10½	.10¾
Zinc Oxide—French Process [b]			
Florence White Seal—7 bbl.	lb.	.09½	.09¾
Green seal—8	lb.	.09	.09¼
Red seal—9	lb.	.08¾	.08¾
Yellows [b]			
Cadmolith	lb.	.55	.60
Chrome	lb.	—	.50
Mapico	lb.	.071	—

BLACKS
(In bags, carload lots)

Arrow Compact		.0355	—
Atlantic		.0355	—
Certified		.0355	—
Certified Spheron		.0355	—
Continental		.0355	—
Disperso		.0355	—
Dixiedensed		.0355	—
Dixiedensed 66		.0355	—
Excello		.0355	—
Furnex		.03½	.06
Furnex Beads		.03½	.06
Gastex		.03½	.06
Kosmobile		.0355	—
Kosmobile 66		.0355	—
Kosmos-Dixie 20	lb.	.03½	.06
Micronex (Amarillo)		.0355	—
Micronex Beads (Amarillo)		.0355	—
Pelletex		.03½	.06
P-33		.04	.06½
Philblack A	lb.	.05	—
Shell Carbon (Del. Midwest)		.0240	—
Sterling		.035	—
Supreme		.0355	—
Thermax		.0225	.05
Wyex		.0355	—

COMPOUNDING MATERIALS

Aluminum Flake	ton	18.00	24.50
99½%-300	ton	—	16.50
86-90%-300	ton	—	13.50
Asbestine	ton	16.50	20.00
Atomite	ton	—	27.50
Barium carbonate (98-100%)	ton	47.00	49.00
Barytes	ton	25.35	36.00
Bentonite	ton	11.00	16.00
Blanc fixe, dry	ton	60.00	67.00
Calcene	ton	37.50	43.00
Catalpo (fact)	lb.	.02	—
Clay, Aerfloted, Suprex	ton	11.00	23.50
Aerfloted Paragon	ton	10.00	22.50
Champion	ton	—	11.00
Crown	ton	—	11.00
Dixie	ton	11.00	23.50
Kaolloid	ton	—	9.00
Langford	ton	—	8.50
Magnolia	ton	—	10.00
McNamee	ton	10.00	22.50
Par	ton	—	11.00
Witco	ton	10.00	—
Kalite No. 1	ton	26.00	52.00
Kalvan	ton	100.00	126.00
Keystone white	ton	—	14.00
Magnesium carbonate	lb.	.06¼	—
Mineralite	ton	—	30.00
Pyrax A	ton	—	8.10
Rottenstone (powd. Dom.)	ton	25.50	37.50
Rubberol	lb.	—	.17½
Silene EF (calcium silicate)	lb.	.055	.06
Silical	ton	65.00	85.00
Snowflake white	ton	—	16.00
Talc, domestic	ton	14.50	—
Whiting, commercial	ton	16.00	26.00
Witco	ton	—	6.50
Witcarb R	ton	—	100.00
Witcarb R-12	ton	—	40.00
Wood Flour (100 mesh)	ton	30.00	32.00

MINERAL RUBBER

285°-300° Mineral Rubber	ton	25.00	27.00
Black Diamond	ton	25.00	—
Dielex	lb.	—	.06
Hard Hydrocarbon	ton	25.00	27.00
MilliMar	lb.	—	.05½

MISCELLANEOUS

Aromatics—Rodo $0	lb.	4.00	4.50
Rodo $10	lb.	5.00	5.50
Curodex 19	lb.	2.75	—
Curodex 188	lb.	3.50	—
Curodex 198	lb.	4.50	—
Para-Dors	lb.	4.50	—
Areaklene No. 375	lb.	.35	.50
Darvan (dispersing agent)	lb.	.30	.39
Santomerse S	lb.	.11	.25
Sponge Paste	lb.	—	.18
Sunproof	lb.	.22¾	.27¾
Tonox	lb.	.50	.59
Ty-Ply	gal.	6.75	8.75
Unicel (blowing agent)	lb.	.50	—

SOFTENERS

Acids			
Acetic, 28%, bbls. [a]	100 lb.	3.38	3.63
Nitric, 36 degrees	cwt.	5.00	—
Acids, Fatty			
Laurex	lb.	.14¼	.17¼
SL-20	lb.	.11	.13
Stearex Beads	lb.	.10	.11
Stearite	lb.	.10	—
Alkalies			
Caustic Soda, 76%	cwt.	2.70	5.70
Soda Ash, 58%	cwt.	1.15	2.98
Oils			
Degras, bbls.[a]	lb.	.10	.12
Para-Flux	gal.	.17	.18
Para-Lube	lb.	.046	.048
Petrolatum, amber	lb.	.03¼	—
Pigmentaroil ,tank cars	gal.	.20½	—
in drums	gal.	.26½	.27¼
Pine, tanks [a]	gal.	.55	—
Rosin Oil, cmpd.	gal.	.40	—
Rubberol	lb.	.13½	.14
Rubtack	lb.	.10	—
Seedine, c.l.	lb.	.07¼	—
Witco Palm Oil	lb.	—	—
Witco Softener No. 20	gal.	.20	—
Woburn No. 8, c.l.	lb.	.06	—
Resins and Pitches			
Pitch, Burgundy	lb.	.08	—
coal tar	ton	19.00	22.00
hardwood	ton	16.00	22.50
pine, 200 lb. gr. wt.	bbl.	—	4.50
Pigmentar, tank cars	gal.	.20½	—
in drums	gal.	.26½	.27½
Retort Pine Tar, drums	gal.	.26½	.27½
Solvents			
Acetone, pure [a]	lb.	.07	—
Benzene, 90%, tank car	gal.	.14	—
Beta-Trichlorethane	gal.	—	.20
Bondogen	lb.	.98	1.25
Carbon, bisulfide	lb.	.05	.08¼
Carbon tetrachloride	gal.	.73	1.27
Dichlorethylene	lb.	—	—
Dipentene, cml., drums	gal.	.48	.50
Ethylene dichloride	lb.	.07½	.08¼
Plastogen	lb.	.07¾	.12
Reogen (drums)	lb.	.11½	.15
Rub-Sol	gal.	.09½	—
Trichlorethylene	lb.	.08	.09¼
Turpentine, steam dist., drums	gal.	.80	.83
Waxes			
Antisol	lb.	.22½	.23½
Beeswax, white [a]	lb.	.58	—
Carnauba, yellow [a]	lb.	.83¼	—
Ceresin, white, dom.	lb.	.13½	.15
Montan, dom.	lb.	.30	.35
Paraffin [a]			
Yellow crude scale, 124/126	lb.	.04¼	—
Refined, 120/122	lb.	.05¼	—

ANTI-OXIDANTS

Agerite Alba	lb.	1.95	2.05
Gel	lb.	.52	.54
Hipar	lb.	.61	.63
Powder	lb.	.40	.42
Resin	lb.	.43	.45
Resin D	lb.	.40	.42
White	lb.	1.23	1.33
Albasan	lb.	.69	.74
Antox	lb.	.54	.56
B-L-E	lb.	.40	.49
Flectol H	lb.	.40	.47
Neozone A, C, D, E	lb.	.40	.63
Oxynone	lb.	.77	.90
Retardex	lb.	.44½	.47½
Santoflex B	lb.	.40	.47
Santoflex BX	lb.	.54	.61
Santovar O	lb.	1.15	1.40
S.C.R.	lb.	.32	.34
Stabilite	lb.	.48	.50
Stabilite Alba	lb.	.69	.74
VGB	lb.	.43	.52

EXTENDERS

Naftolen R-100	lb.	.10	.12

LUBRICANTS—MOLD & RUBBER SURFACE

Areaklene	lb.	.35	.50
Cocoa Soapstock	lb.	.06	.08
Colite	gal.	.90	1.15
Dipex	lb.	.06	.08
Glycerized Liquid Lubricant	gal.	—	1.35
Lubrex	lb.	.25	.30
Mineralite	ton	—	30.00
Sericite	ton	65.00	75.00
Soap Tree Bark, cut, sifted	lb.	.06	.08

FACTICE OR RUBBER SUBSTITUTES

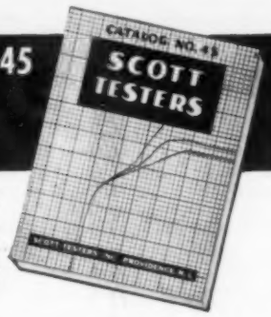
Amberex	lb.	.25	—
Amberex Type B	lb.	.18½	—
Black	lb.	.08½	.13
White	lb.	.09	.15
Brown	lb.	.10	.14
Neophax A	lb.	.16½	—

VULCANIZING INGREDIENTS

Dispersed Sulfur No. 3	lb.	.08	.12
Sulfur Chloride, yellow (drs.)	lb.	.03	.08½
Sulfur, rubber makers			
Refined (bags)	cwt.	2.55	—
Commercial (bags)	cwt.	2.30	—
Telloy	lb.	1.75	—
Vandex	lb.	1.75	—
Vultac No. 1	lb.	.38	.43
Vultac No. 2	lb.	.38	.43
Vultac No. 3	lb.	.42	.49

[a] Price Ceilings.
[b] Price Suggestions or Agreements.

NEW CATALOG No. 45
AND TESTING HANDBOOK
JUST PUBLISHED
Request Your Copy



Contains full description of numerous standard physical testing methods and machines – plus a wealth of related reference data.

SCOTT TESTERS, INC. 85 Blackstone St. Providence, R. I.

Carey MAGNESIA

OXIDES AND CARBONATES LIGHT AND HEAVY • FOR TECHNICAL & DRUG USES

THE PHILIP CAREY MFG. COMPANY

BRANCHES IN ALL PRINCIPAL CITIES

Lockland, CINCINNATI 15, OHIO

Wm. S. GRAY & CO. DISTRIBUTORS NEW YORK CITY

NEW & REBUILT MACHINERY

Equipped to Furnish Complete Plants

L. ALBERT & SON

OFFICES AND PLANTS

TRENTON, N. J. • AKRON, OHIO
LOS ANGELES, CALIF. • STOUGHTON, MASS.

Our Rebuilding Process Removes the Element of Risk by These Five Important Steps:

1. INSPECTED
2. DISASSEMBLED
3. REBUILT
4. MODERNIZED
5. GUARANTEED

Our New Machines:
MILLS
MIXERS
BRAKES
PRESSES
CUTTERS
SUSAN GRINDERS

RMP ANTIMONY

for RED RUBBER

• ATTRACTIVE
• NON-DETERIORATING

RARE METAL PRODUCTS CO.
BELLEVILLE, N. J.

BALATA SYNTHETIC CRUDE RUBBER

Servicing Rubber Reserve Permits

Charles F. Connor & Co., Inc.
110 STATE STREET
BOSTON 9, MASS.

Phone—Lafayette 1202

SOFTENERS and PLASTICIZERS
For RUBBER
From the Pine Tree

ROSIN OIL
PINE TAR
BURGUNDY PITCH
GALEX a non-oxidizing RESIN

Send for "Pine Tree Products" *Booklet*

NATIONAL ROSIN OIL & SIZE CO.
R. K. O. BUILDING, RADIO CITY, NEW YORK, N. Y.
Plant: Savannah, Ga. Branches in Principal Cities
PIONEERS OF THE INDUSTRY

ERNEST JACOBY & CO.

Crude Rubber	*Liquid Latex*
Crown Rubber Clay	*Carbon Black*
Rubber Chemicals	*Rubber Colors*

Stocks of above carried at all times

BOSTON - 79 Milk St. - MASS.

Cable Address: Jacobite Boston

METALLURGICAL SERVICE CO.

PROCESS ENGINEERS
COMMERCIAL HEAT TREATERS
INDIANAPOLIS 2, INDIANA

RUBBER DENUDING

WITHOUT AFFECTING THE PHYSICAL PROPERTIES OF METAL INSERTS

* * *

SUBMIT TRIAL SAMPLES

WANT ADS

RATES: Eight cents per word, minimum charge $3.00, except POSITIONS WANTED, $1.00 for 40 words or less, extra five cents per word. All classified advertisements payable in advance. Address replies to box numbers care of RUBBER AGE, 250 West 57th St., New York 19, N. Y.

POSITIONS WANTED

RUBBER CHEMIST, 16 years' experience with large and small companies in mechanicals, proofing, tires and latex and raw material evaluation; interested in technical sales or factory compounding. Address Box 1757, RUBBER AGE.

RUBBER CHEMIST, 45, at present employed, 17 years in complete charge of management, production, labor and research of rubber department manufacturing rubber sundries, molded and extruded, natural and synthetics. Also experienced with plastics, adhesives, and finishing materials. Capable of taking charge of plant or laboratory. Address Box 1763, RUBBER AGE.

FACTORY SUPERINTENDENT with background of 30 years' experience desires permanent connection with small or medium sized plant, preferably Eastern location. Thoroughly qualified to organize and direct all activities, including compounding, mixing, calendering, molding, extruding, and finishing mechanical and specialty products from natural and synthetic rubbers and plastics. Cost experience and trade connections. Address Box 1768, RUBBER AGE.

HELP WANTED

TIRE AND TUBE PLANT located in South has opening for Rubber Chemist. Requirements: Experience in all phases of processing and manufacture Tire and Tube stocks. Good opportunity for energetic man looking for a post-way job with possibilities of advancement. Give full particulars including expected salary in first letter. Address Box 1740, RUBBER AGE.

TIRE AND TUBE DEVELOPMENT AND SPECIFICATION ENGINEERS. Progressive small Eastern concern. Definite opportunity for advancement for man with experience and capability. Address Box 1741, RUBBER AGE.

RUBBER CHEMIST for development and production control. A permanent position for an aggressive and capable young man to grow up with the expanding Rubber Division of an old established company in the South. State experience and salary expected. Address Box 1760, RUBBER AGE.

PRODUCTION MANAGER for small camelback and mechanical rubber plant in pleasant small midwest city. Best living conditions, schools, churches. Mill room experience necessary, press room experience desirable. Salary $4,500.00; can increase by bonus contingent on results to $7,500.00. Address Box 1764, RUBBER AGE.

CHEMIST. Thorough knowledge of tire, tube, or mechanical goods manufacture. Plant located in Pennsylvania. Excellent opportunity. All replies strictly confidential. Address Box 1742, RUBBER AGE.

RUBBER CHEMIST: Experienced in molded mechanicals and drug sundries. Knowledge of both natural and synthetic rubber. Excellent opportunity with small progressive company located in New England. List qualifications and salary desired in first reply. Address Box 1765, RUBBER AGE.

TIRE CURING FOREMAN. Opening for experienced foreman capable of supervising production. Attractive post-war as well as present day opportunity. Eastern concern. Address Box 1743, RUBBER AGE.

CHEMICAL, MECHANICAL OR ELECTRICAL ENGINEER to supervise production and mechanical phase of branch plant of nationally known company, manufacturing adhesive products in Detroit area. General factory supervision experience desirable. Experience in rubber field preferable, but not essential. Excellent opportunity for one with executive ability. Address Box 1767, RUBBER AGE.

PLASTIC CHEMIST: New England concern wants chemist with full knowledge of compounding, milling, and calendering Vinyl Powder and Vinyl Polymer scrap. Knowledge of coating fabric plus ability to manufacture the necessary ingredients also essential. We offer an opportunity to get in with a fast growing concern on a profit-sharing basis. Allowances can be made for present essential deferment. All replies held in strict confidence. Address Box 1770, RUBBER AGE.

HELP WANTED (Continued)

PRESS ROOM FOREMAN: Excellent opportunity with progressive company manufacturing mechanical and drug sundries. Plant located in New England. Address Box 1766, RUBBER AGE.

TIRE FINISHING SUPERVISOR. Must have experience in supervising all duties connected with cured tire final finishing. Excellent opportunity for advancement and post-war security. Located in Pennsylvania. Address Box 1744, RUBBER AGE.

ENGINEER for mid-west company producing mechanical rubber goods. Must have wide experience, thorough knowledge of mold design. Top grade man required. Excellent future. List qualifications, salary desired, and send photograph. Address Box 1776, RUBBER AGE.

LATEX PRODUCTION MAN: One able to supervise plant. Excellent opportunity. Address Box 1771, RUBBER AGE.

WANTED: A man with technical and sales experience to call on rubber manufacturers in the Middle West to sell pigments and chemicals. Address Box 1774, RUBBER AGE.

TUBE ROOM SUPERINTENDENT AND FOREMAN. Must have thorough knowledge of all phases inner tube manufacture. Opening offers excellent opportunity to man with initiative and ability. Plant located in Pennsylvania. State qualifications first letter. Address Box 1745, RUBBER AGE.

Also See Page 374

BUSINESS OPPORTUNITIES

WANTED TO BUY FOR EGYPT, automotive, industrial camelback, tire repair materials, domestic and sanitary goods. Write AMEG, 144 West 27th Street, New York 1, N. Y.

FOR SALE: Rubber Molding Plant and Machine Shop, specializing in oil field specialties. Some patented articles, patents may be had with plant. Some products established over 20 years. Located in Southern California. Principals only. For particulars, address Box 1779, RUBBER AGE.

WANTED MIXING TIME on Banbury or mills for black stock—also straining and refining. Address Box 1762, RUBBER AGE.

We do Rubber Compounding, Light Color Stock Mixings and GR-S Breakdown. FRANK T. BAKER, RUBBER PRODUCTS AND COMPOUNDING, 63 Arch Street, Fall River, Massachusetts.

RUBBER GOODS MFG. PLANT FOR SALE, going, profitable concern with good equipment. Total price $30,000. Address Box 1732, RUBBER AGE.

EQUIPMENT WANTED

WANTED: Rubber Mill 36" to 54", complete with bull gear but without reduction gears on motor. Address Box 1769, RUBBER AGE.

WANTED—Hydraulic Presses with pump and accumulator. Banbury Mixer, Mills, Calender, Tubers, any condition. Address ox 1773, RUBBER AGE.

WANTED: One 16 x 42 or 22 x 60 Rubber Mill complete with drive, with or without motor, 60 cycle, 3 phase, 220 volts, first-class condition. In your reply please state price, location, and complete description of equipment. Address Box 1778, RUBBER AGE.

LONG ESTABLISHED, REPUTABLE CONCERN WITH SUBSTANTIAL CAPITAL

WILL BUY FOR CASH

Assets, Capital Stock, Family Holdings of

INDUSTRIAL PLANTS, MFG. DIVISIONS, UNITS

Among other considerations you may realize certain desirable tax advantages.

We are Principals, and act only in strictest confidence, retaining personnel wherever possible. Address

Box 1212; 1474 Broadway, New York 18, N. Y.

EQUIPMENT FOR SALE

FOR SALE: RUBBER CALENDER 3 roll—54″ Thropp, completely rebuilt. Address RUBBER LINING ENGINEERS, 2700 West 35th Street, Chicago 32, Ill.

FOR SALE: 8″ ALLEN STRAINER, good condition, Cylindrical Head, Open Gear Reduction. Address Box 1772, RUBBER AGE.

FOR SALE: RUBBER MILL—1 Erie 60″ x 22″ equipped with drive and motor, never used, immediate delivery. Address Box 1761, RUBBER AGE.

FOR SALE: ACCUMULATOR, high pressure, 12″ x 14′; 82 gal. with 58 tons circular cast iron ballast weights; or weights for sale separately. Address ERIC BONWITT, Akron 8, Ohio.

FOR SALE: 6″ x 13″ Two Roll Rubber Mill; Royle No. 3 "Perfected" Tuber, with 25 HP motor; 2—2′ x 8′ Horizontal Vulcanizers; 10″ x 28″ Rubber Mill; 100 gallon W. & P. Jacketed Mixers. BRILL EQUIPMENT COMPANY, 225 West 34th Street, New York 1, N. Y.

FOR SALE: NEVER USED Cleveland Speed Reducer, 139 H.P., ratio 8 to 1. 4—24″ x 24″ Hydraulic Presses, 2 openings, 2—10″, 2—12″ rams, complete. Tubers 3¼″ to 6″. 3—30″ x 24″ Hydraulic Presses, 12″ rams. 4—W. & P. Mixers, up to 625 gallon capacity; 10—High Pressure Hydraulic Pumps. Accumulators up to 6,000 GPM. Dry Mixers, Grinders, Pulverizers, etc. Send for complete list. CONSOLIDATED PRODUCTS COMPANY, INC., 14-19 Park Row, New York 7, N. Y.

FOR SALE

Hydraulic Presses: 600 ton Watson-Stillman 24″ x 24″; 1—36″ x 36″, 12″ ram; 4—2 post 20″ x 20″, 8″ rams; 1—52″ x 26″, 14″ ram; 3—12″ x 12″, 7½ rams; 1—20″ x 20″, 14″ ram; 2—30″ x 52″, 1 with 15″ ram, 4 openings, 1 with 6″ ram, 3 openings; 1—26″ x 45″, 10″ ram; 1—38″ dia., 12″ ram pump attached; 1—14″ x 20″ Combination Hydraulic Toggle. Pumps: 1—Watson-Stillman duplex high and low pressure ¾ GPM, 4000 lbs. continuous bedplate; Hele Shaw JLP 12, 44 GPM, 1200 lbs.; HPM Triplex 1¾ GPM, 2000 lbs. on high, 16 GPM, 400 lbs. on low, V belt drive; Robertson Triplex 5 GPM, 5000 lbs.; Union Steam Pump Viscolizer, 5 GPM, 2500 lbs.; 2 Hauser, 4 plunger, 4.6 GPM, 5000 lbs. on high, 20 GPM, 500 lbs. on low; Gould Triplex 35 GPM, 1500 lbs.; 1—National 1″ x 3″ Triplex, 4000 lbs., 3 GPM. Accumulators: Hydro-pneumatic Watson-Stillman 9 GPS, 6000 lbs.; weighted type, 1—5″ dia., 6′ stroke ram; 1—8″ dia., 6′ stroke ram. Extruders, Mills, Calenders, Mixers, etc. Advise your requirements. Highest Prices Paid for Your Used Equipment. UNIVERSAL HYDRAULIC MACHINERY COMPANY, 285 Hudson Street, New York 13, N. Y.

YOUR OPPORTUNITY

Investigate the possibility of tax benefits under existing conditions to sell your going manufacturing business for cash. Complete assets, capital stock of manufacturing firms, machinery manufacturers or industrial plants wanted. Your every confidence is held with all personnel retained if possible. Substantial capital available. Prefer businesses of over $100,000.

Address Box 1749
RUBBER AGE
250 West 57th St., New York 19, N. Y.

COLORS for RUBBER

Red Iron Oxides
Green Chromium Oxides
Green Chromium Hydroxides

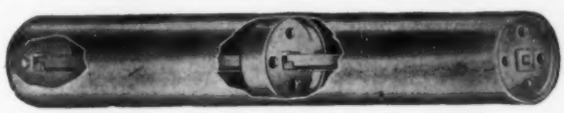
•

Reinforcing Fillers and Inerts

C. K. WILLIAMS & CO.

EASTON, PA.

New and Better
GAMMETER'S
ALL STEEL ALL WELDED
CALENDER STOCK SHELL



4″ - 5″ - 6″ - 8″ - 10″ - 12″ diameters, any length.

Besides our well known Standard and Heavy Duty Constructions, we can supply light weight drums made up to suit your needs.

THE W. F. GAMMETER COMPANY
CADIZ, OHIO

Directory of CONSULTANTS

WILBURN F. BERNSTEIN

Consultant—Engineering—Product development, research, testing and patent investigations in the fields of rubber, synthetic rubber and plastics.

One No. LaSalle St., Chicago 2, Ill.

PHILIP TUCKER GIDLEY

Consulting Technologist—Research, physical testing, chemical analysis, formulae and product development.

Fairhaven, Massachusetts

THE JAMES F. MUMPER CO.

Plant Engineering—New plants, alterations, rehabilitation, modernization. Maintenance and special equipment. Tool design. Plans, specifications, investigations and reports. Complete engineering for industry.

313-14-15 Everett Bldg., Akron 8, Ohio

R. R. OLIN LABORATORIES

Rubber Technologist—Development and research in Natural Rubber, Synthetic Rubber and Plastics. Also chemicals and compounding materials used with these materials.

P. O. Box 372 (Telephone HEmlock 3724) Akron 9, Ohio

PIGMENT RESEARCH LABORATORIES

New products evaluated. Compounding and testing pigments in rubber, synthetics and thermoplastics. Particle sizing. Emmett, Brunauer surface area tests. Supervision industrial research programs in New England technical colleges.

11 Windsor Street, Cambridge 39, Mass.

FOSTER D. SNELL, INC.

Our chemical, bacteriological, engineering and medical staff with completely equipped laboratories are prepared to render you Every Form of Chemical Service.

Ask for
"The Consulting Chemist and Your Business"
312 Washington Street, Brooklyn 1, N. Y.

INDEX TO ADVERTISERS

Adamson United Co. ....
Adhesive Products Corp. 479
Advance Solvents & Chemical Corp. 410
Agawam Chemicals, Inc. 397
Akron Standard Mold Co. 483
Albert & Son, L. 489
American Anode, Inc. 381
American Cyanamid & Chemical Corp. ....
American Pine Tar & Chemical Corp. ....
American Viscose Corp. 398, 399
American Zinc Sales Co. 396
Angier Products Co., Inc. 395
Armstrong Tire & Rubber Co. 374
Atlas Electric Devices Co. ....
Automatic Sprinkler Corp. of America ....

Baker Castor Oil Company 413
Baker Chemical Co., J. T. 482
Barrett Div., Allied Chemical & Dye Corp. ....
Beacon Co. 479
Bernstein, Wilburn F. 491
Binney & Smith Co. .... Insert Following 450
Bonwitt, Eric ....
Brockton Cutting Die & Machine Co. ....
Bunatak Chemical Co. ....

Caldwell Co., The 382
Carbide & Carbon Chemicals Corp. ....
Carey, Phillip, Mfg. Co. 489
Carter Bell Manufacturing Co., The 476
CLASSIFIED ADVERTISING 490-491
Cleveland Electric Illuminating Co. 416
Cleveland Liner & Mfg. Co. .... Back Cover
Columbian Carbon Co. .... Insert Following 450
Connor, Charles F. & Co., Inc. 489
CONSULTANTS SECTION 491
Continental Carbon Co. 384
Continental Machinery Co. 484
Continental-Mexican Co. ....

Dispensions Process, Inc. 375
Du Pont de Nemours & Co., E. I. .... Inside Front Cover

Erie Engine & Mfg. Co. 391

Farrel-Birmingham Co., Inc. 387
Fawick Airflex Co., Inc. 411
Firestone Tire & Rubber Co. 377
Flintkote Co., The ....

Gammeter, W. F. Co. 491
Gardner-Richardson Co. 415
General Atlas Carbon 376
General Chemical Co. 401
General Latex & Chemical Corp. 388
General Magnesite & Magnesia Co. 477
Gidley, Philip Tucker 491
Goodrick, B. F., Chemical Co. 369
Goodyear Tire & Rubber Co., Plastic and Chemical Div. 373

Hall Co., The C. P. 473
Herron Bros. & Meyer 390
Heveatex Corporation 485
Hosdreg Industries, Inc. 472
Huber, J. M., Inc. 420
Hycar Chemical Co. 367

Independent Die & Supply Co. 480
Industrial Oven Engineering Co. 473
Industrial Rayon Corp. 389

Jacoby, Ernest & Co. 489
Johnson Corp., The ....
Johnson, S. C., & Son, Inc. ....

Koppers Company ....
Littlejohn & Co., Inc. ....
Lowenthal Company 400
Ludlow-Saylor Wire Co. ....

Magnetic Gauge Co. ....
Marbon Corp. ....
Mercer-Robinson Company, Inc. 480
Metallurgical Service Co. 489
Meyer & Brown, Inc. 481
Meyercord Company 471
Monsanto Chemical Co. 417
Moore & Munger ....
Mt. Vernon—Woodbury Mills, Inc. 406
Muehlstein & Co., H., Inc. ....
Mumper, James F. 491

National Lead Co. 408
National Rosin Oil & Size Co. 489
National Rubber Machinery Co. 412
National Sheradizing and Machine Co. 482
National-Standard Co. 380
Naugatuck Chem. Div., U. S. Rubber Co. 422
Neville Co. 482
New Jersey Zinc Co. 378
New Wrinkle, Inc. 475
Niagara Alkali Company 403
Olin Laboratories, The R. R. 491

Pancorbo, M. ....
Pennsylvania Industrial Chemical Corp. ....
Pequanoc Rubber Co. 386
Philadelphia Rubber Works Co. 370
Phillips Petroleum Co. 368
Pigment Research Laboratories 491
Pittsburgh Plate Glass Co., Columbia Chemical Div. ....
Polymel Corp. ....
Precision Scientific Co. 407
Procter & Gamble 481
%Proportioneers, Inc.% ....
Protective Coatings, Inc. 482
Protectoseal Company ....

Rand Rubber Co. 478
Randall, Frank E. 477
Rare Metal Products Co. 489
Rayon Processing Co. of R. I., The 484
Reichhold Chemicals, Inc. 379
Resinous Products & Chemical Co. ....
Revertex Corp. of America 477
Rohm & Haas Company ....
Royle & Sons, John 419

St. Joseph Lead Co. 414
Schulman, A., Inc. .... Inside Back Cover
Scott Testers, Inc. 489
Sharples Chemicals, Inc. 405
Shell Oil Co., Inc. ....
Simplex Cloth Cutting Machine Co., Inc. 483
Skelly Oil Co., Solvents Div. ....
Snell, Foster D., Inc. 491
Spadone Machine Co. ....
Stamford Rubber Supply Co. 492
Stanco Distributors, Inlc. 409
Stanco Incorporated 372
Standard Chemical Co. 385
Stanford Engineering Co. 477
Stauffer Chemical Co. 479
Stearns Magnetic Mfg. Co. ....
Sun Oil Co. ....

Taber Instrument Corp. 485
Tanney-Costello Co. ....
Textile Proofers, Inc. 478
Thropp & Sons, William R. 485
Titanium Pigment Corp. ....
Turner Halsey Company 406

Union Bay State Chemical Co. 404
Union Carbide & Chemical Corp. ....
United Carbon Co. .... Insert Following 392
United Engineering & Foundry Co. ....
U. S. Rubber Reclaiming Co. 487
U. S. Stoneware Co. ....
Utility Mfg. Co. 483

Vanderbilt, R. T., Co. .... Front Cover
Waldron Corp., John ....
Wells Bronze & Aluminum Foundry, Inc. ....
Whittaker, Clark & Daniels, Inc. 481
Williams, C. K., & Co. 491
Wilmington Chemical Corp. 731
Witco Chemical Company 383, 402

Xylos Rubber Co. 377

Stamford Neophax Vulcanized Oil

(REG. U. S. PAT. OFF.)

For Use With Neoprene

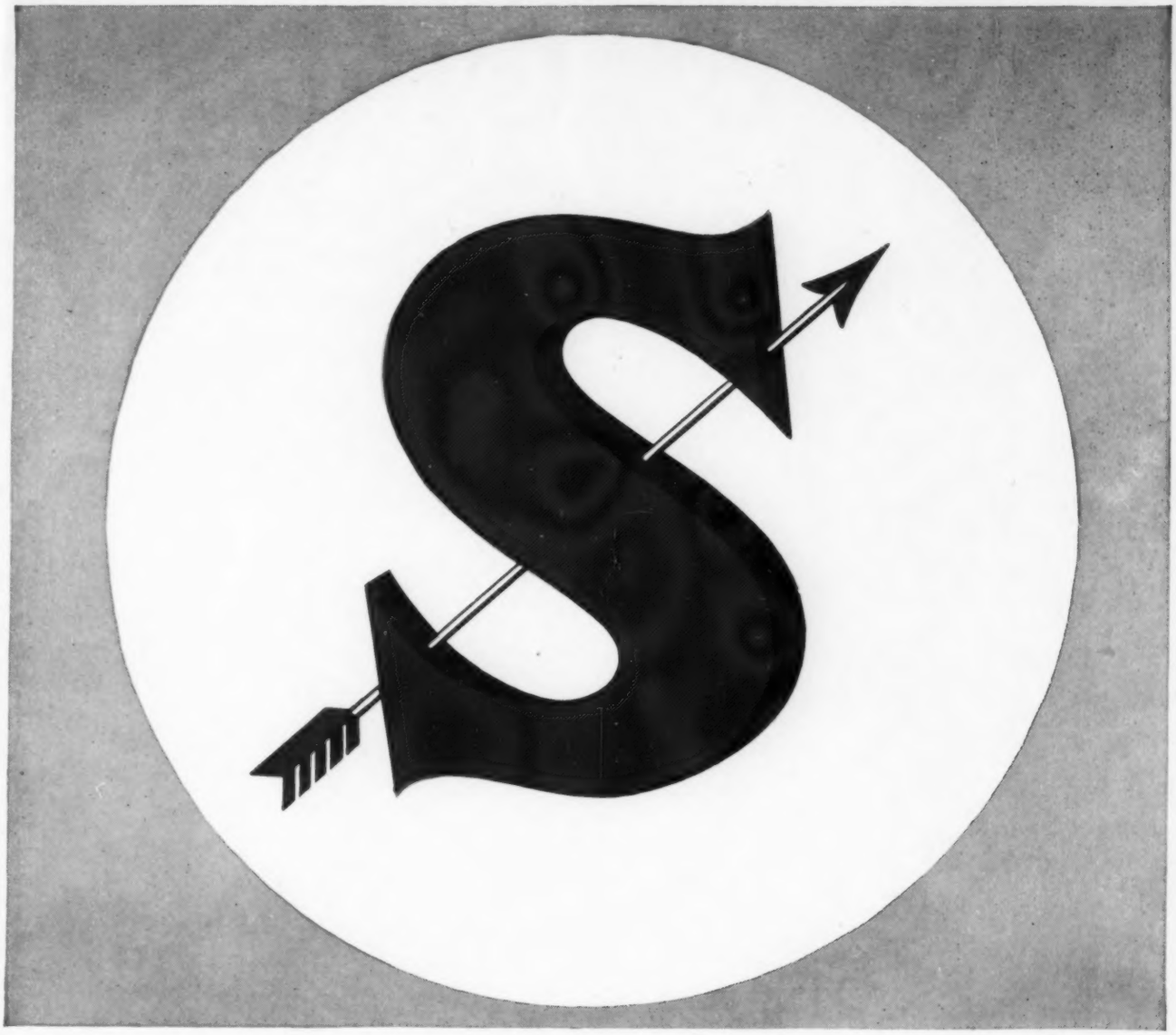
THE STAMFORD RUBBER SUPPLY CO

STAMFORD CONN.

Makers of Stamford "Factice" Vulcanized Oil Since 1900

(Reg. U. S. Pat. Off.)

HUGHES PRINTING CO.
EAST STROUDSBURG, PA.



THE SCHULMAN SYMBOL OF ACCURATE SORTING

Every sorting job done at a Schulman warehouse is supervised by experts who know Scrap Rubber from A to Z. Careful workmen separate each type of rubber according to kind, quality, color, specific gravity... a process that insures the reclaimer exactly what he wants for any variety of run.

The Schulman "arrow S" represents skill and experience in following specifications to the letter. Be *safe* with Schulman.

A. Schulman Inc.
Scrap Rubber

AKRON 9, OHIO • NEW YORK 18, NEW YORK • EAST ST. LOUIS, ILL. • BOSTON 16, MASS. • CONNEAUT, OHIO

Do You Know...

- How to insert liner with stocks?
- The best way to separate stock and liner?
- Why liner leaders are important?
- How to prevent lint and ravelings?
- About the use of liners with substitutes?
- How to preserve the stock's tackiness?
- When and where to use interleaving paper?

This Booklet
CONTAINS THE ANSWERS (AND MANY MORE)!

Illustrated with diagrams, this booklet contains a complete account of the many advantages gained by using Climco Processed Liners. It also contains many valuable hints on the proper care and use of liners, information based upon our 23 years of specialization in liner processing. Every production man in the industry should have a copy of this valuable booklet. Your copy will be sent promptly upon request.

LINERETTE
INTERLEAVING PAPER
Treatment Contains
NO OIL OR WAX
Samples on Request

THE CLEVELAND LINER & MFG. CO.
5508 MAURICE AVENUE • CLEVELAND 4, OHIO

CLIMCO PROCESSED LINERS
for Faster, Better Production at Lower Cost